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THE
GEOGRAPHICAL REVIEW

VOL. I MAY, 1916 NO. 5

A NEW LEWIS AND CLARK MAP

By ANNIE HELOISE ABEL, Ph.D.
Associate Professor of History, Smith College

[With facsimile map, Pl. II, facing p. 344]

The possible—and, one might easily add, the almost inevitable—recovery of historical sources, even though they be lost for many years, finds no better illustration than in connection with the records of the great Lewis and Clark exploring expedition of 1804 to 1806. It is well known that President Jefferson, in making arrangements for that expedition, was insistent that careful and complete records of it, in detail, should be kept, and they were kept, yet Jefferson's purpose failed of logical fulfillment by reason of the fact that, in his time, they were never brought all together into one place and published. On the contrary, they became widely scattered, and some of them have never to this day been traced. In recent years, however, important finds have been made and reported. For example, when, in 1905, R. G. Thwaites published his excellent edition of such of the original journals as were then known for a certainty to exist, he had occasion to record the circumstances of the recovery of some of them, notably the Whitehouse diary. Last summer his eminent successor, Milo M. Quaife, had a similar task to perform,[1] he having, with the aid of others, relocated the long-lost Ordway narrative, which is shortly to appear in print under his editorship.[2]

Such recoveries as those of Thwaites and Quaife called, of course, the attention of historical scholars to the existence of various repositories of Lewis and Clark data and offered the suggestion that more might yet be

[1] Cf. *Mississippi Valley Hist. Rev.*, June, 1915, pp. 108-109.

[2] After this study had been thoroughly well entered upon, it developed that Mr. Quaife, having heard that a Lewis and Clark map had been found in the U. S. Indian Office, had hopes of being able to reproduce it in conjunction with the Ordway Journal. The study was not abandoned, however, mainly for the reason that the Indian Office authorities wished it to proceed and were decidedly averse to having the map advertised as a Lewis and Clark map until after its identity had been satisfactorily established. Moreover, the present investigator felt that, since even a cursory examination showed the map to be a very valuable one historically, it was deserving of a more extended, specific, and individual treatment than it could possibly get were it to appear with the Ordway Journal, particularly as that was already in the hands of the printer.

found, and, as a matter of fact, another has been found and that within the last few months. The new repository is the U. S. Indian Office and, considering that Clark was for so large a part of his life in direct connection with that office, the wonder is that special students of the Lewis and Clark expedition never thought of it as a possibility before.

The particular way in which the Indian Office is already proved to be a repository of Lewis and Clark data is in its possession of a manuscript map that has recently come to light among its archives. This map, upon examination, reveals itself to be of such a character that it seems safe to contend that it must assuredly have constituted a very useful portion of the original Lewis and Clark equipment and is certainly not a thing heretofore noted by either collectors or editors.

The map was found by H. M. Hamblin, M.D., a clerk in the Mails and Files Division of the Office of Indian Affairs, among some old Central Superintendency "Accounts."[3] It was enclosed with other maps and sketches[4]—all presumably once of Clark ownership[5]—in a wrapper,

[3] "Accounts," it should be explained, include, in Indian Office filing, "Estimates," "Property Returns," "Vouchers," and the like.

[4] The contents comprised:—

a. A tracing showing the Mississippi, the Missouri for a short distance above the Kansas, Lakes Michigan, Superior, and Winnipeg, and then the country onwards to the Pacific. Towards the south appear the "sources of Rio Norte according to De Lisle."

b. A rough sketch showing the Mississippi River from its junction with the Ohio to a little below Memphis. On the west bank of the Mississippi, opposite the mouth of the Ohio, is "Spanish Guard," where customs were collected. Lower down is Fort Jefferson.

c. A rough sketch showing the Mississippi River from the Louisiana line, latitude 33° N., to Rock River and giving various Indian boundaries. The Cherokees are shown as living west of the Mississippi.

d. A rough sketch of "Chipaway and Sioux Lines," showing Fort Snelling and a Sauk River encampment "after the peace made at St. Peters 1821."

e. A rough sketch showing a part of the Kaw and Osage cessions of 1808 and 1825, with Fort Osage near Fire Prairie and Cantonment Gibson located.

f. A rough sketch illustrative of certain phases of the Black Hawk War. Memoranda on the back indicate the whereabouts of "Coles party" upon information furnished by Mr. Forsyth (Agent Thomas Forsyth?) and give a list of "good" chiefs and one of "bad." At the top appears the name, "Frances Lesseur."

g. A plat of the survey of the Ioway and Sauk lands by W. S. Donohoe, surveyor, 1837.

h. A plan of fortifications, indeterminate.

i. A copy of a contemporary map with added details.

j. A census map of the region of the "Bend of the Missouri, Long. 101° 25′—Lat. 47° 32′ by Mr. Thomson . . . in 1798." On the outside of the map is written, "A sketch of the North Bend of the Missouri. This belongs to Capt. Lewis."

k. An incomplete tracing of the Missouri and Platte Rivers on a scale of 50 miles to the inch.

l. A "Sketch given by George Drewyer, 5th August, 1808," indicating "the road to the Spanish settlements" and the "supposed" waters of the "Gulph of California," also the "establishment made by Manuel Lisa in October 1807" with the information communicated, apparently in Clark's handwriting, that "from this establishment a man on horseback can travel to the Spanish country in 14 days—" (for corroborative testimony on this point, see Coues's citation of Clark N125 in "History of the Expedition under the Command of Lewis and Clark," Vol. 3, p. 1153, note 14.) In connection with the Manuel Lisa establishment, it is interesting to observe that Drewyer placed it where one of the Clark maps (*cf.* Coues, Vol. 4, No. 2) placed it; that is, right in the fork of the Big Horn and Yellowstone Rivers. It will be noted that Chittenden, contrariwise, placed it on the east bank of the Big Horn and the south bank of the Yellowstone (*cf.* "History of the Fur Trade of the Far West," Vol. 3, map). He further described it as "on the west bank of the river—just above latitude 46° N." (*ibid.*, p. 956). Apparently Chittenden confounded its location with the site of the Clark camp, July 26, 1806 (*cf* "Original Journals," Vol. 5, p. 296, and Vol. 8, map, No. 51).

[5] This is inferred from the fact that they all date from the period and relate to the region of Clark's official activities.

bearing the following vaguely identifying superscription, or endorsement:

Retained[6]
Central Superin[y]
Maps &c
of
Indian Country

The particular bundle of "Accounts" in which it was had no distinguishing marks, no special label, no office brief, no file notation.[7] In short, it had nothing whatever about it that would differentiate it from a thousand or more other such bundles or that would indicate ever so slightly how exceedingly interesting, not to say especially valuable, some of its contents might possibly be. Had it not happened, forsooth, to be the business of Dr. Hamblin to sort the "Accounts," the richly detailed Clark map, subject of this investigation and discussion, might easily have been consigned to oblivion for another hundred years or lost altogether, accidentally burnt,[8] or even destroyed,[9] perchance, under authority of the next Executive Order, the issue of which might at any time be rendered necessary by the pressure of current business and the congested state of the Indian Office quarters.

An attempt to identify the Indian Office map gave rise to several conjectures, some fundamental, represented by the following and other interrogatories:

1. Is it a map illustrative of the Lewis and Clark expedition?
2. Was it made subsequent to the expedition?
3. Was it made during the expedition?
4. Was it made anterior to the expedition?
5. If made before the expedition, is it,
    a. The Mackay map?
    b. The Evans map?
    c. A composite itinerary map?
6. What is its geographical and historical value?

[6] Clark's letter to Biddle, January 27, 1818, reproduced in facsimile in Coues, Vol. 1, would indicate that Clark was of the opinion that he had a perfect right to hold back at discretion anything bearing upon the expedition that was not of strictly scientific value and that, under no circumstances, did he entirely relinquish certain possessory rights in the data. This may account for the Indian Office map's not being with the rest of the Clark data. In other words, the "retained" on the wrapper is significant. It implies that the map was not left at the headquarters of the Central Superintendency by accident.

[7] Agency and Superintendency papers, sent in from the field, after an office is discontinued or changed in location, bear, of course, no file-marks. They are only indirectly a part of the Indian Office records and are not so well looked after as even the regular files.

[8] The particular "Accounts" in which the map was found were and are stored in the basement of the Pension Building in close proximity to the furnace. So cramped is the Indian Office at present that there is really no other place for them.

[9] Under comparatively recent Congressional enactment, no government records can be destroyed until they have first been submitted to a competent authority in the Library of Congress in order that their historical value or lack of value may be determined. In practice, the departments submit a list of the

Considering these questions in their order, we can begin by answering the first of them in this wise: The map is most certainly illustrative of so much of the Lewis and Clark expedition as extended from the point of beginning, St. Charles, to the Mandan villages. The proof of this is found chiefly in the fact that all places of importance, mentioned in any of the travel narratives descriptive of the expedition, are marked upon the map as well as at least one thing[10] that the explorers heard about in the course of their voyage up the Missouri River and incidentally commented upon. Moreover, the map itself bears this endorsement (Fig. 1):[11]

For Captn William Clark
or
Captn Meriwether Lewis
a
on their voyage up the
Mississippi.

The only noteworthy expedition that Lewis and Clark ever made together was the famous one of 1804-1806. The name "Mississippi" must have been accidentally inserted in the endorsement instead of that of "Missouri"; for the map is not in any sense illustrative of the Mississippi region and it is of the Missouri. It is worth noting, however, that the same confounding of the Mississippi with the Missouri occurs in the Jefferson correspondence bearing upon the great expeditions.

The Indian Office map appears not to have been made subsequent to the expedition, at all events, not in its entirety and not in its main portion; for, although, as will be conclusively proved before this study is done, it carries more of the journal geographical detail than any known map of the time, it varies from the journals in certain marked ways, or, more specifically speaking, it does not accord closely enough with them to have been made

papers set aside for destruction, and occasionally that list is so non-committal that it is returned for more specific detail. Neither the ordinary list nor the additional description would ever have saved the Lewis and Clark map from destruction. How it came to be among "Accounts" is a mystery; for "Accounts," properly speaking, are regular Indian Office records, and the bundle in which the map was belonged to Superintendency records. Its being among "Accounts" made its situation all the more precarious. "Accounts" figure in duplicate, and the Indian Office has frequently gone upon the supposition that since the originals are in existence anyway, lodged with the Treasury Department, the duplicates among its files may well be the first things to be disposed of when more room is needed—and it is even now urgently needed—for current business.

[10] "Mr. Louisells House in the Winter 1803 & 4"

[11] The endorsement is on the back of the map and is reproduced here as it is in the original. Another thing on the back of the map may possibly be an additional means of identification. It is the name of "Peter Tabeau." The name appears written first in pencil, thus:—Mr. Peter Tabeau, and then in ink, thus (Fig. 2):—

Mr. Peter Tabeau
at the Ricaries.

In the journals there are various references to a Mr. Tabo, or Tabeau. Thwaites, in his index to the "Original Journals," mentions only one Tabeau and that one bears the Christian name of "Antoine"; but, in the text of the narratives, the mention is usually of "Mr." Tabo, or Tabeau. Antoine is referred to directly in one instance only, which might imply that wherever else a Tabeau is noted some other one than Antoine, or Anty, is meant. Such a supposition would permit of a place for Peter. The Tabeau of the journals, whatever his Christian name may have been, is always found associated with the Arikara Indians (Ricaries).

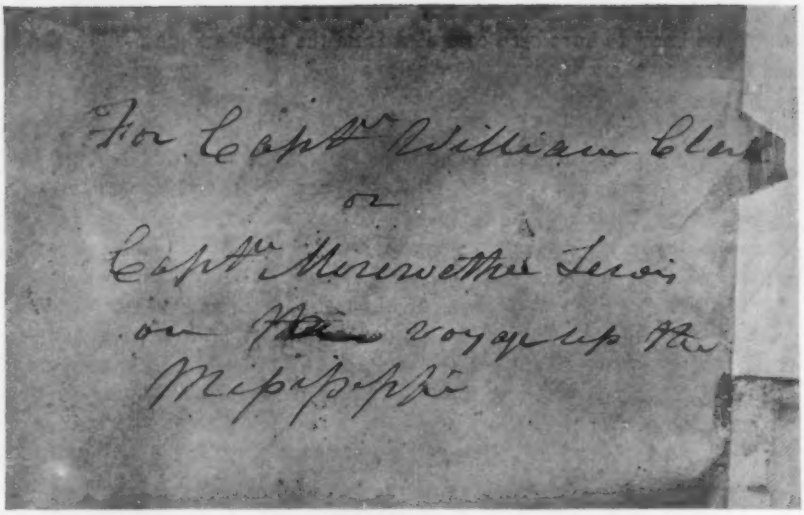

FIG. 1.

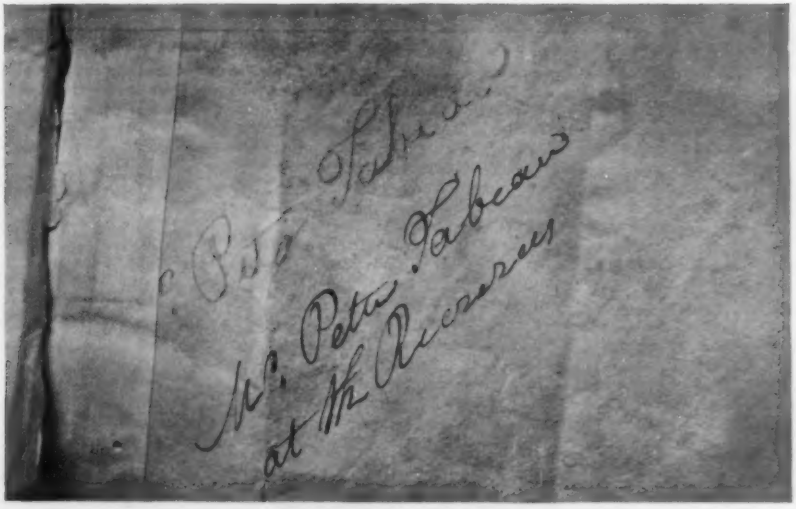

FIG. 2.

FIG. 1—Endorsement on the back of the newly discovered Lewis and Clark map.

FIG. 2—Additional entry on the back of the map.

from them. And it is not in any way related to the Lewis 1806 map,[12] which we know to have been compiled from the travelers' data.

A close scrutiny of the discrepancies between the journals and the Indian Office map strengthens the opinion that not only was the map not made subsequent to the expedition, but it was not even made during the expedition. The very differences are of such a nature that they attest the fact that the map antedates all the written records. Neither names assigned to newly discovered places—that is, places noted for the first time by these explorers—, nor new names assigned to places previously known appear on it, as is sufficiently instanced in the cases of "Independence Creek,"[13] discovered July 4th, 1804, "Council Bluffs,"[14] in the vicinity of which the explorers held a council with the Indians, "Floyd's River,"[15] named after Sergeant Floyd of the expedition, who died August 20th, 1804, and the "Teton River,"[16] rechristened because the Teton Sioux were found dwelling in its neighborhood. Furthermore, some few things that Lewis and Clark had heard about but which they were obliged to record in their journals as not having been found, notably, "the old fort"[17] on the Missouri River, above its junction with the Grand, and "the old volcanoe,"[18] southward of the mouth of the White, have, on the Indian Office map, a rather conspicuous position, as have also many places that either are not referred to in the least by the journals or are referred to under other names.[19] Quite interestingly, too, an occasional item of the map data is incorrect when judged by the journals.[20] Finally,

---

[12] Conveniently to be found in Coues.

[13] "... as this Creek has no name, and this being the 4th of July the day of the independance of the U S. call it 4th of July 1804 Creek, ... this Creek we call *Creek Independence* ..." (Thwaites, Vol. 1, pp. 66-67).

"... passed a creek ... which we called INDEPENDENCE ..." (Hosmer's "Gass," p. 11).

[14] "The situation of our last Camp *Councile Bluff* ..." (Thwaites, Vol. 1, p. 98).

"*Thursday 2nd* ... This place we named Council-Bluff ..." (Hosmer's "Gass," p. 17).

"... 12 of the Zottoe Indians Arrivd at Our Camp Calld the Council Bluffs, or the Brarareham prarie ..." ("Whitehouse's Journal," p. 47).

[15] "... We buried him (Floyd) on the top of the bluff ½ Mile below a Small river to which we Gave his name ..." (Thwaites, Vol. 1, p. 114).

"... Our commanding officers gave it the name of Floyd's river; ..." (Hosmer's "Gass," p. 21).

"... we named this hill Sgt Floyd's Bluff we then proceeded on to a Creek on the Same Side which we named Sgt Floyds Creek" ("Whitehouse's Journal," p. 51).

[16] "... Came to about 1½ Miles above off the Mouth of a Small river about 70 yards wide Called by Mr. Evens the Little Mississou [*Missouri*] River. The Tribes of the Seauex Called the Teton. is Camped about 2 Miles up on the N. W. Side, and we Shall Call the River after that Nation, *Teton*. ..." (Thwaites, Vol. 1, p. 163).

[17] "... we came to on the S. S. in a Prarie at the place where Mr Mackey lais down a old french fort, ..." (Thwaites, Vol. 1, p. 50).

[18] "... I walked on Shore with a view to find an old Vulcanoe, Said to be in this neighbourhood by Mr J. McKey of St Charles. I walked on Shore the whole day without Seeing any appearance of the Vulcanoe ..." (Thwaites, Vol. 1, pp. 146-147).

[19] The most prominent of these are: Renville River, probably what the explorers called the Whitestone (*cf.* Thwaites, Vol. 1, p. 119; Coues, Vol. 1, p. 84; Whitehouse, p. 52; Gass, p. 22), or the present Vermilion, and Old Englishman's Island. Some of less significance are: Tobacco Island, Five Barrels Island, Iron Island, Peter's Island, Good Island, the Four Islands, Buffalo Island, Little Island, Isle of the Sioux, Polecat Island (apparently in the neighborhood of the place where the explorers say they found pole-cats, September 17, 1804), Half-moon Island, Little Missouri Island, Friendship Island, Cock Island.

[20] Some of these will be noted presently in another connection; but the discrepancy involved in the location of Cock Island (I. au Coc) may as well be disposed of here. Cock Island appears on the map a considerable distance above the mouth of the Maropa River; but the only thing mentioned in the travel narratives that would correspond to it is Grouse Island, and Grouse Island was passed by Lewis and Clark

innumerable small creeks and islands and a few other things,[21] noted by the explorers, and some of them expressly named[22] by them, are not on the map at all.

In addition to what has already been said answering negatively the third question in our scheme of conjecture, Was the map made while the expedition was in progress? these facts can be adduced: The paper is too thin and the chirography too regular and too elegant, the lines of writing are, as a rule, too uniformly parallel to warrant the supposition that the map was made, from start to finish, under the rough conditions incident to travel. It might, indeed, be thought from the appearance of the map that it was not even taken upon the voyage. It shows so few signs of really hard usage. It is true it is very brittle now, so brittle and worn that it will scarcely bear handling. The brittleness, however, is simply a sign of age, perhaps, also, the result of folding[23] and of exposure to intense heat.

That the map was taken upon the expedition and used and consulted may be readily surmised from an examination of certain interesting additions to its data, additions made under circumstances no more conducive to neat work than most likely were those connected with the voyage of 1804. The extreme northwestern section of the map, that depicting the region, say, between the White River and the Mandan villages, has every appearance of having been checked up by means of underscoring lines.[24] Not too much need be made of the circumstance, however, since the check marks occur only at rare intervals, and, all told, are exceedingly few in number. It is just as if the explorers treasured their map too highly to care to deface it.[25] In the same upper portion of the map occurs material that may or may

after they had passed the Sur-war-kar-na and before they had come to the We-tar-hoo, much less to the Maropa (*cf.* Thwaites: Original Journals, Vol. 1, pp. 182-183). Cases where an island and a creek in close proximity to each other carry the same name, the one being on the map and the other in the journals, are not regarded, in this study, as mistakes or discrepancies. We have, for instance, an I. au Bonhomme on the map, a Bonum Creek in the journal; a R. a la L'outre on the map, a Luter Island in the journal, and so on. There is, on the map, a small unnamed stream opposite I. au Bonhomme and an island opposite R. a la L'outre.

[21] A few of these are: Island of Mills (Thwaites, Vol. 1, p. 43), Shecco Island (*ibid.*, p. 45), Plumb Creek (*ibid.*, p. 46), Tabboe Creek, Tiger River, Panther Isle (*ibid.*, p. 52), Hay Cabbin Creek (*ibid.*, p. 57), Chabonea Creek, Bennet's Creek (*ibid.*, p. 58), Dimond Island, Biscuit Creek, Tree Frog Island, Tree Frog Creek (*ibid.*, p. 63), Four le tourtere Prarie (*ibid.*, p. 83), Lake Despree (*ibid.*, p. 103), Black Bird's grave (*ibid.*, p. 106), Mahars Wau can di Peeche Creek (*ibid.*, p. 107), Good Humered Island (*ibid.*, p. 163), etc.

[22] Cupboard Creek, Nightingale Creek (Thwaites, Vol. 1, p. 38), Lead Creek, Sand Creek (*ibid.*, p. 40), Indian Knob Creek (*ibid.*, p. 92), No Preserves Island (*ibid.*, p. 140), Corvus Creek (*ibid.*, p. 150), Sentinal Creek, Lookout Creek (*ibid.*, p. 175), Island of Caution (*ibid.*, p. 177), etc.

[23] It had been folded into small compass and, when found, was cracked and broken at the seams. An unwise attempt to repair such damage resulted in worse. As a matter of fact, the frail paper should have been immediately mounted upon linen or something equally broad and stable.

[24] R. petit Missouri is underscored; so is an unnamed right tributary farther upstream, so also are the Maropa River, Labeaume's River, and various of the Indian village groups. I have taken the unnamed river of the map to be the We tar hoo of the journals (*cf.* Thwaites, Vol. 1, p. 183), described as heading in the Black Hills, which, on the map, it does.

[25] There is some reason for thinking that the explorers guarded and handled their map so carefully that they did not consult it on every possible occasion. Had they done so, they would most certainly have remarked the fact that the river they note as known by the name of Whitestone was labeled on the map the Renville. This they did not do.

not be new. It consists of legends crowded in,[26] forcing a departure from the original parallel appearance of the lines of writing. The chief objection to considering this matter new is the fact that the legends are in both French and English. Lewis and Clark, as will be argued more at length later on, could have had no good reason for inserting into the detail of a map already crowded the French equivalents of insignificant place names. Most of the additions, if additions they be, inclusive of the underscoring lines, were made in lead pencil.[27] Some were later inked over,[28] others left in penciled form.[29] A few additions,[30] occurring at the top of the map, were written in the first instance with ink and are taken to be additions because the penmanship is large and sprawling, quite different in general character from that of the bulk of the map. They include names like St.

[26] I am not at all prepared to insist or even to claim that this seemingly crowded-in material is new. It has the appearance of having been written with the same quill and by the same hand and to have been inked at the same time as the bulk of the map. Moreover, I am puzzled by the fact that Good Hope Island, which the explorers introduced (Thwaites, Vol. 1, p. 179) by the familiar, "we call", is not crowded in and is not in a different handwriting and has its French equivalent, I. bonne Esperance, immediately below itself on the map. It is barely possible, of course, that in this case Lewis and Clark erroneously but inadvertently claimed the credit of having done the christening. On the western side of the Missouri River and nearly opposite the mouth of the Otter River is a large stream designated simply "Riviere" on the map. In location it exactly corresponds to the Sur-war-kar-na of the journals and, as Lewis says in his notes (Thwaites, Vol. 6, p. 49), it "takes its rise short of the Black Hills . . ." The writing of the word "Riviere" is fine and regular, the *e* differently shaped from the usual *e* of the map. Is it fair to conclude, then, that the person who attempted to add the name stopped short at "Riviere" because he could not spell the Indian Sur-war-kar-na? Other instances of the kind are not entirely wanting, as for example, "Prairie du", "Prairie," "I-& village".

[27] The skeleton of the entire map seems to have been traced originally in pencil.

[28] As for instance, "Mr Louisells House in the Winter 1803&4" and "50 Leagues to the Mouth of the Missouri", the latter legend being written on what I have chosen to regard as an extended portion of the map and, therefore, new. The part referred to is unmistakably an extension and in no sense a part of the original drawing, it being very plainly discernible where the work of one cartographer ended and that of another began. The extension is drawn on approximately the same scale as the remainder of the map. It reaches from and beyond the Mandan villages, perhaps in order to make a proper connection with the Yellowstone and was very probably put in after Clark had returned to the Mandan villages by way of the Yellowstone.

[29] Some of these I cannot satisfactorily decipher. An extremely faint legend beyond the Black Hills I at first thought might possibly be meant for "Jon Vallie," and the journals tell us that the travelers did fall in with a Frenchman of that name (the Jean Vallé of Thwaites's suggestion), who informed them "that he wintered last winter 300 Leagues up the Chien River under the Black mountains . . ." (Thwaites, Vol. 1, p. 176); but I have since changed my mind. Two of the penciled names that I can decipher are "Yellow Stone R." and "Fork River." "Fork River" is written alongside of "Dog River" (R. du Chien), but upside down, a circumstance which supports the contention that penciled names are new. "Yellow Stone River" and "Black Mountains" had no pencil foundation: but "Black Hills" is found written near the margin, in pencil. Some writing on the upper waters of the James River has been rendered a trifle more clear by the photostatic process but is not yet clear enough to be confidently interpreted.

[30] My supposition is that these additions were made by the explorers to indicate the "headings" of rivers. Again and again they tell us of what they have learned about the sources of some of the rivers they pass or of such and such a river "heading" in a certain locality or at some approximate distance. Thus, on June 13, 1804, they record that the Grand River "heads with the R. Dumoine," and the map suggests it. Under date of August 29, 1804, the river James (Jacques, or Yankton) is described as passing the Sioux River and as heading with the St. Peters. On the map, the James River (R a Jacques) parallels an improvised Big Soox, rising beyond it to the north, and receives a tributary from the direction of the Red River of the North, also improvised. On the 13th of October, Lewis and Clark learned from the Rickores (Arickarras) "that the Yankton or R Jacque heads at about 2 Days March of this place Easterly, the R. de Seaux one Day further, the Chien (*Chayenne the Chay[s] formerly there*) a branch of R. Rouche (*Rouge*) Still beyend, and the River *St. Peters* 4 days march from this place on the Same Derection . . ." On the map, again, the "Riviere" appears to rise in the first range of the Black Hills and to that Clark bears testimony under date of October 7th.

Peters, Demoin, Big Soox, and Camerons House. It took some little time to decipher the name last given, the map being defective and the writing scarcely more than a mere scratch of the pen. Reference to Lewis' notes, however, revealed[31] the fact that a trader of the name of Cameron[32] had been heard of as having his headquarters in the region, and a photostatic copy of the map disclosed, much more clearly than did the original, the legend, "Camerons House."

The addition that is a really worth while contribution is something that has been already cited twice in the footnotes, namely, "Mr Louisells House in the Winter 1803 & 4." This legend is in the near vicinity of "Island of the Three Sisters" (Les I. de 3 Soeurs) and "Goat Island" (I. au Cabris). It is written upside down. The history of its insertion may be suggestively traced by means of journal entries. When Lewis and Clark were in the neighborhood of River a Chouritte, May 25, 1804, they record[33] that they "met with M. Louisell, imedeately down from the Seeder [Cedar] Isl^{d} Situated in the Country of the Sciox [Sioux] 400 Leagues up . . ." and that Mr. Louisell gave them "a good Deel of Information . . ." Very probably he told them of the location of his own trading house. Anyway, on the twenty-second of September, after they had passed an island, "Called the 3 Sisters," they came to one, "Called Ceder Island," and this is what they have to say about it: "this Island is about 1½ miles long & nearly as wide Covered with Ceder, on the South Side of this Island Mr. Louiselle a trader from S^{t} Louis built a fort of Ceder & a good house to trade with the Seaux & Wintered last winter: . . ."[34] After taking careful note of Louisell's fort,[35] they "proceeded on and Camp^{d} late on the S. Side below a Small Island in the bend S. S. Called Goat Island, . . ."[36] It is interesting to observe that map and journal, with Clark as the writer of the one particular entry[37] and Lewis of the other,[38] spell the trader's name in exactly the same way. Lewis, it is true, adds a final *e*; but that need not be deemed significant, because the spelling of the journals varies to a remarkable degree and

[31] ". . . The Sioux annually hold a fair on some part of this river (James), in the latter end of May, thither the Yanktons of the North, and the Sissitons, who trade with a M^{r} Cammaron on the head of the S^{t} Peters river, bring . . ." (Thwaites: Original Journals, Vol. 6, p. 45).

[32] Undoubtedly the same as the Cameron of the Journals ("Original Journals," Vol. 1, p. 267) and the Murdoch Cameron who, in 1805, was a trader on the St. Peters in Minnesota. (*Cf.* Coues: New Light on the Early History of the Greater Northwest, Vol. 1, p. 189, note 8. See also Coues: The Expeditions of Zebulon M. Pike, Vol. 1, p. 66 and note, p. 64. Pike calls Murdock Cameron "a Scotchman by birth, but an Englishman by prejudice," *ibid.*, p. 64).

There were several men of the name of Cameron connected with the Northwest Company (*cf.* Masson, Vol. 2, p. 231, and Coues: New Light on the Early History of the Greater Northwest, Vol. 1, p. 189, note 8). For additional information about Murdoch Cameron, see Neill's article on "Indian Trade" in *Minnesota Hist. Soc. Annals*, 1852, p. 43.

[33] Thwaites: Original Journals, Vol. 1, p. 29.

[34] *Ibid.*, p. 160.

[35] Gass gives a minute description of the fort, including its dimensions, which would indicate that it was carefully examined by at least some of the party.

[36] Thwaites: Original Journals, Vol. 1, p. 161.

[37] May 25, 1804.

[38] September 22, 1804.

even in the same sentence. Gass spells[39] the name "Lucelle," and it was ordinarily spelled "Loisel."[40]

The similarity in spelling that has just been noted is all the more worthy of remark, because, ordinarily, the spelling of what, for the sake of argument if for nothing else, we have chosen to regard as the older part of the map is most emphatically not the spelling of the journals.[41] The map almost invariably presents the French place-name and its English equivalent, or what is intended[42] to be an English[43] equivalent, and the use of the two languages gives color to the view—particularly as the French is the original[44] and the English the translation—that the map was most certainly not made during the expedition or afterwards. The explorers were Americans using the English language as their native tongue. They could have had no reason for jotting down, first hand and systematically, the French name for even tiny creeks, notwithstanding the fact that some of their employees were Frenchmen and that they were constantly coming across Indians to whom the French language had become as familiar as their own. Besides, the map data that, for other reasons, seem to be new, do not, in a single instance, have a strictly French form. The journals sometimes give the French name but they always give it as additional or explanatory information, except in cases where the French name must have been the only one known and used. Discrepancies in spelling are often to be accounted for by the varying use of French and English or by a very limited knowledge of the former. They are not such as would preclude the idea that the map was in the hands[45] of the explorers for, at the least, occasional consultation, but they would contradict the notion that the legends on the map were written either at the same time as or from the journals.

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[39] *Cf.* Hosmer's "Gass's Journal," p. 35.

[40] For instances of such spelling, see the report of Regis Loisel, signed by himself, dated San Luis de Ylinoa, May 28, 1804, published in Houck's "Spanish Régime in Missouri," Vol. 2, pp. 359-364, also Billon's "St. Louis in the Early Days," p. 465; and a Clark memorandum (Thwaites, Vol. 6, p. 59).

[41] This statement should be modified to some extent, for quite often the spelling of names, enclosed by parentheses or by brackets, is the spelling. For Thwaites's explanation of enclosed matter, see "Original Journals," Vol. 1, p. 11, note 1. Moreover, *antient* is used on the map and in Clark's contribution to the travel narratives, which is a rather interesting coincidence, if it is nothing more.

[42] Sometimes the equivalents are what one might call the approximate or the obvious rather than the exact translations. Thus, "Isles des Parques" is rendered "Field Islands"; "I. au Cabris," "Goat Island"; "I. au biche," "Elk Island"; "Isle au bœuf," in one place, "Beef Island," in another, "Buffaloe Island"; "I. de periche," is "Peter's Island."

[43] In one instance we have an attempted French equivalent, and, at the same time, perhaps, an interesting case of folk etymology. The present Cannon Ball River is labeled "R. a la Bomb, Labeaume's River." The river was very likely named in honor of Louis Labeaume (Labaume) (*cf.* Houck's "Spanish Régime in Missouri," Vol. 2, p. 299; American State Papers: Public Lands, Vol. 3, p. 699). The name would literally mean "balm"; but the spelling Labaume would indicate the pronunciation and explain, in a measure, the supposed equivalent.

[44] There seems no good reason to doubt this. The French has always the right of way on the map. It is the one written first and the one that has the greater amount of room given it. Yet I would not have it thought that I incline to the opinion that the English was added later. Both the English and the French appear to be the work of one draftsman.

[45] It seems a little strange that, if the explorers did have the map before them, they did not see fit to comment upon some of its peculiarities. Why, for example, did they not mention in their journals Labadie's Island, Lapensee's Channel, R. & Chanaille de baton (Cane River and Channel), Premier Poste

It now having been determined that the Indian Office manuscript map could scarcely have been made either during the progress of the Lewis and Clark expedition or subsequent to its completion, inasmuch as map and narrative journals differ too much in terminology and in character of information conveyed for them ever to have been the work of the same mind or minds and of the same period, there remains a consideration of the question whether or no the authorship of the map is to be ascribed to one of two men, James Mackay, a Scotchman, and John Evans, a Welshman, both of whom, in their capacity as agents of the Missouri Company, are believed to have prepared a map illustrative of that particular part of the Missouri River region that they individually explored. Up to date neither map has, for a certainty, been seen since the prosecution of the Lewis and Clark expedition.

The organization of the Missouri Company, a commercial concern, having for its object the establishment of trade relations with the great tribes of the Upper Missouri, though begun earlier, was not formally completed until May, 1794. Its headquarters were at St. Louis, and from that point, during the next few years, various exploring expeditions started out. The first was led by Jean Baptiste Truteau. From June 7, 1794, to March 25, 1795, Truteau penetrated a considerable distance up the Missouri in what proved to be a vain search after the Arikaras and, in the summer of 1795, he sojourned about two months among them. His diary, describing the incidents of the first summer,[46] has recently come to light and bears an interesting

de la Compagnie du Missouri, Riv. & Village des Petite Os, R. du vieux Langlois, and, finally, the most puzzling thing on the map, Riv. à Renville?

As a general thing it can be said that most of the prominent people interested in Indian trade at the time are represented by name upon the Indian Office map. No doubt the expression, "vieux Langlois," ought not to be translated into "old Englishman's," since there were traders of the name (*cf.* Henry's "Journal," in Coues's edition, Vol. I, p. 50, note). Concerning the Riv. à Renville, some additional remarks might well have a place here. The first letter of the name on the map proved exceedingly difficult of determination. The river, bearing the name, is evidently the Whitestone of the journals and the Vermilion of today. The initial part of the map name might easily pass for *Th*, *K*, or *R*. The resulting name would then be Thenville, Kenville, or Renville; but no such name appears upon any contemporary map that has been, for purposes of this study, accessible, either in the Library of Congress or elsewhere. In travel narratives of the Missouri River region and beyond "Thenville" does not seem to figure at all. "Kenville" does, but out of range of the Vermilion (*cf.* Coues: New Light on the Early History of the Greater Northwest, Vol. 2, p. 627). A Joseph Renville, on the other hand, was known in the early days on the Upper Missouri. He was probably born about 1726 (*cf.* Tanguay's "Dictionnaire Généalogique des Familles Canadiennes," Vol. 3) and, at the time of the organization of the Northwest Company, identified himself with it (E. D. Neill: Indian Trade, *Annals Minnesota Hist. Soc.*, 1852, p. 42). This would have doubtless brought him, as it brought Faribault (*cf.* H. H. Sibley, in *Minnesota Hist. Collections*, Vol. 3, p. 171) into the country of the Yankton Sioux. At all events, he married a Sioux woman. His son, another Joseph Renville, was a Sioux interpreter in the time of Pike (*cf.* Coues: The Expeditions of Zebulon M. Pike, Vol. 1, p. 40, note 46) and was later associated commercially with Dixon, who had a post in the vicinity of the mouth of the Vermilion, hence the name, "Dixon's Bluff" (*cf.* map published with the Report of I. N. Nicollet, *Senate Doc., 26th Cong., 2nd Sess.*). The region of the Vermilion was originally Sioux country, and it seems more than likely that the father, equally with the son, traded there. The name is variously spelled, even as late as the middle of the nineteenth century, Renville or Rainville (*Indian Office Register of Letters Received*, Vol. 28, July 11, 1844, and July 18, 1844).

[46] This is the so-called first part of Truteau's journal, and it was discovered in the Archives of the Indies at Seville by Roscoe R. Hill. It covers the period from June 7, 1794, to March 25, 1795, and is to be found, in its French form, in the *Amer. Hist. Rev.*, January, 1914, pp. 301-333. The second part of Truteau's journal, that extending from May 24, 1795, to July 20, 1795, has been known for some time. It appears in translation in the *Missouri Hist. Soc. Collections* for 1912. Strictly speaking, perhaps, it should be counted the third part, since a narrative of the intervening period, from March 25, 1795, to May 24, 1795, is supposed to have been prepared and may be yet in existence somewhere.

comparison with the Indian Office manuscript map. This idea will be enlarged upon later.

In 1795, Mackay was similarly sent up the Missouri, and he explored the river course as far as the Omaha, or Maha, villages.[47] He was accompanied[48] by Evans whom, in the year following, he himself authorized[49] to proceed farther, even to the Mandans. Evans reached his destination in due season and destroyed a British fort, or trading post, erected there.[50] Of his later movements, little is known. In 1799, Mackay reported him as ill and his system deranged.[51] He probably did not long survive. Mackay, on the other hand, lived for several years, dying in 1823.[52] He made his home within easy reach of St. Louis, occupied most of the time with matters that involved him in land litigation.

Reference has already been made to a possible Mackay and to a possible Evans map, and the evidence bearing upon each point will now be investigated. That a Mackay map once existed is inferred from a statement[53] made by James Mackay himself to the effect that, from a certain voyage of discovery up the Missouri River, he had brought memoirs and a map, and likewise from two[54] references in the journals of the Lewis and Clark expedition. A third[55] reference is sometimes cited as also testifying to the existence of a Mackay map; but it is of such a nature that it might better imply a conversation than a map, and such a conversation Lewis, if not Clark, could most certainly have had with Mackay on the occasion of one of his frequent trips to St. Louis and vicinity while the expeditionary party was encamped from December to May on the Dubois River.

The proof that there was ever an Evans map is to be found in the correspondence of Jefferson as well as in the journals[56] of the Lewis and Clark expedition. Jefferson, writing to Lewis, January 13, 1804,[57] with reference to the preparations being made for the proposed exploration of the Missouri, said, "I now inclose you a map of the Missouri as far as the Mandans, 12 or 1,500 miles I presume above its mouth, it is said to be very accurate having been done by a M^{r} Evans by order of the Spanish government. . . ."

[47] See "Report of Governor Zenon Trudeau, 1798," in Houck's "Spanish Régime in Missouri," Vol. 2, p. 253.

[48] Michaux gives as a journal entry for December 11, 1795, the following: "I was informed at Illinois that Mackey a Scotchman and Even a Welshman, started at the end of July 1795 from St. Louis to ascend the Missouri in a 4 oared Barge. They are aided by a Company whereof Charles Morgan (Jacques Clanmorgan), a creole from the Islands, is manager." (*Cf.* Thwaites: Early Western Travels, 1748-1846, Vol. 3, pp. 79-80.)

[49] "Through my fear of arriving late next summer at the Mandans, I am going to send out a detachment within a few days under charge of Monsieur Even, until he meets Trudeau who must have already constructed his fort among the above-mentioned Mandans, if he has experienced no opposition on the part of the English, who have had the audacity to unfurl their banner there." (*Cf.* Mackay's "Journal" in Houck's "Spanish Régime in Missouri," Vol. 2, p. 192.)

[50] See Thwaites's British Régime in Wisconsin, *Wisconsin Hist. Collections*, Vol. 18, p. 451, note 72.

[51] American State Papers: Public Lands, Vol. 6, p. 719.

[52] See Houck's "History of Missouri," Vol. 2, p. 71, note 145.

[53] American State Papers: Public Lands, Vol. 6, pp. 718, 720, and Vol. 8, p. 868.

[54] Original Journals, Vols. 1, p. 50, and 6, p. 125.

[55] *Ibid.*, Vol. 1, p. 147.

[56] *Ibid.*, Vol. 1, pp. 163, 195, 198, 200.

[57] Jefferson Papers, Letter Press Copy Books, Series I, Vol. 10 (1804-1805), No. 1.

Writing again, on the 22nd,[58] he repeated his message, saying, "... in that of the 13th inst. I inclosed you the map of a Mr Evans, a Welshman employed by the Spanish government for that purpose." Jefferson had previously sent to Lewis extracts[59] from the journal of Truteau. Later on, he sent a transcript.

It now behooves us to decide the question of the identity of the Indian Office map with the Mackay map. The former shows the Missouri River country to the Mandan villages; but, so far as we know, Mackay never went beyond the recognized territory of the Omahas and Poncas. It is, of course, barely possible that the maps ambiguously attributed severally to Mackay and Evans were a single joint affair, Mackay contributing the data for the lower part and Evans that for the upper.[60] Jefferson may have been impressed with the idea that it was entirely the work of Evans; because he was chiefly concerned with its farthermost reach and it was probably matter of common report that Evans had traveled to the Mandans. The map satisfies, with one possible exception, the journal references to both Mackay and Evans, so that they furnish little assistance on this particular point. The map maker, whoever he may have been, had no great mastery of the French language.[61] Nothing is known concerning Evans' knowledge of either French or Spanish; but Mackay's[62] seems to have been worthy of special comment. Teggart, be it remembered, is of the opinion that the Perrin du Lac map is substantially the same as the Mackay map.[63] That being the case, the Indian Office map is certainly not the Mackay map. Both may, perchance, be copies of the same original. They are enough alike to give some support to that view and yet they differ in marked ways.[64] The Perrin

[58] *Ibid.*, No. 8.

[59] *Ibid.*, Vol. 9 (1802-1803), No. 305.

[60] There is a slight difference in the workmanship of the two parts of the Indian office map, the lower part showing greater wealth of detail.

[61] This is illustrated in a number of ways, as, for instance, in confusion of gender, in ignorance of exact or of fine shades of meaning, and in the use of the article. The following are cases in point:

Rivière à la roche percée, really "Pierced Rock River," is rendered "Split Rock."

Rivière petit Manitou, "Small Great Spirit River," is rendered "Little Conjurer River."

Rivière à flèche, "Arrow River," is rendered "Flint River."

Petite rivière platte, "Little Flat River," is rendered "Little Shoal River."

Rivière au vase is translated as "Muddy River." It would be correct to call the river such, were the expression "Rivière à vase," since *vase*, feminine gender, means "mud." *Vase*, masculine gender, means a "vase."

Isles des Parques is translated, "Field Islands"; but the plural of the French word, signifying the English "park," is *parcs*. *Parques* would be more correctly rendered "the Fates."

I. au cabris offers a case of a singular article and a plural noun.

I. au biche is translated "Elk Island"; but *biche* is a feminine noun and signifies the female deer.

[62] Houck's "History of Missouri," Vol. 2, p. 70; Teggart's "Notes on Lewis and Clark" in *Rept. Amer. Hist. Assoc.*, 1908, p. 194 and note *h*.

[63] *Rept. Amer. Hist. Assoc.*, 1908, pp. 188-189.

[64] The subjoined tabulation is based upon a comparison of the two maps from the Grand River to the point on the Missouri where the Perrin du Lac map data end:

Perrin du Lac Map	*Indian Office Map*
Wachante ou endroit de serpens	Wocanton, ou Endroit des serpents
Anciens villages des petits Os et Missouris	Antient village des Missouri Antient vill of the Missouri Antient village petits os Antient village of the little Osages
vieux Fort	Vieux fort
Marais des apaques	marais des apaques flag Pond

du Lac map[65] does not satisfy all the journal references; but it does give, as the Indian Office map does not, the Mackay route of 1796. It is faulty in its use of French, as is the other. Both call a certain thing, Marais des apaques, which the Indian Office map translates as Flag Pond; but, while the Perrin du Lac map offers *ancien* for "old" or "former," the Indian Office map offers the incorrect, or at least unusual, *antient* of the journals. Conversely, be it said the Nichinibatone of the Perrin du Lac map more nearly approaches the Neesh-nah-ba-to-na of the journals and of today than does the "R. & Chanaille de baton" of the other map.

That the Indian Office map is the map that, under the name of the Evans map, was transmitted to Lewis by Jefferson is the most satisfactory conclusion reached by the author of this article. It is not contended that it is the identical map that Evans may have made. Jefferson is really the only authority for the supposition that Evans personally ever made a map, and, as intimated before, the map that goes under the name of the Evans map,

Perrin du Lac Map	*Indian Office Map*
Prairie de Sacki	Prairie des Sakias Sakia Prairie
R. du Feu	(river unnamed)
Prairie du Feu	Prairie du
R. de l'Eau bleue	l'Eau bleu blue water River
R. des Kancés	Riviere des Kances Kances River
Petite Riviere Platte	petite Riv. platte little Shoal River
J. de Parc	Isles des Parques Field Islands
1er Ancien village des Kances	premier antl village des Kances first old vill of the Kances
Wasabi Wachanda	
2e Ancien village des Kances	2nd vieux village Kances 2d old village of the Kances
Prairie St Michel	Prairie de St Michel St Michael's Prairie
Riviere Madavvay	Riv. Nadawa Mandan River
R. du Loup	R. des Loups Wolf River
	R. Taquio Taquio River
R. Grand Nimakas	R. grand Ni Maha Big Nimaha River
J. St Joseph	Isle St Joseph St Joseph's Island
R. Nichinibatone	R. & Chanaille de baton Cane River & Channel
R. Petit Nimakas	petit R. Nimaha little Rivr of the Nimaha
J. Achoven	Isle Chauvin Chavin's Island
l'eau qua pleure	R. Eau qui pleure weeping water
	I. du Tobac Tobacco Island
oeil de fer	I. du fer Iron Isld
	I. de 5 Barrils five Barrels Island (*footnote 64 continued on next page*)

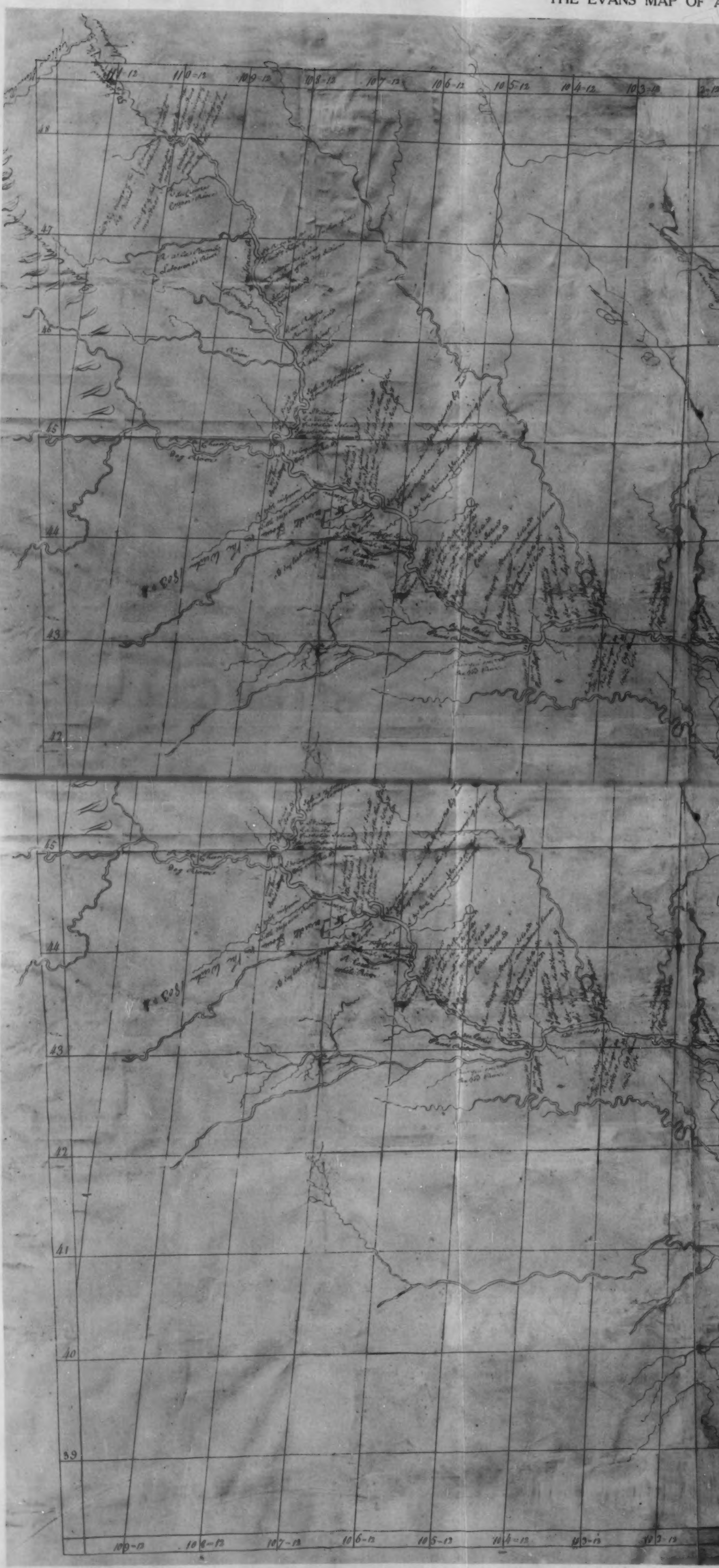
[65] For convenience of reference, it should be observed that the so-called Perrin du Lac map, originally published in connection with Perrin du Lac's "Voyage dans les deux Louisianes et chez les Nations Sauvages du Missouri en 1801, 1802, et 1803," Paris, 1805, has been reprinted in *South Dakota Hist. Collections*, Vol. 7.

in the Jefferson correspondence, may in reality have been the same map that Mackay described as his own. Again, let it be repeated that the Indian Office map satisfies, with one exception, all the Lewis and Clark journal references to both Evans and Mackay. It also illustrates the journals generally and, more important still, it illustrates the Truteau narrative. What Jefferson very probably did was to have a certain map that had come into his possession, maybe through Michaux, and that depicted the Mackay and Evans expedition (for the journeys of the two men were actually parts of a single expedition) copied with particular reference to the needs of Lewis and Clark and its French terminology translated, for their edification, into English. The inexperience of the translator may possibly account for faulty French syntax, for the attempted translation of proper names, and even for the transference of "ancien village des petits ares" into the very much more natural "Riv. & village des petits os" (River & Village of the Little Osages).

Perrin du Lac Map	*Indian Office Map*
Per Poste de la Compagnie du haut Missouri	Premier Poste de la Compagnie du Missouri the first post of the Missouri Company
R. Platte	Riv. Platte Shoal River
....	R. du Papillion Butterfly River
	Aiouah Bluffs Ecore des Aioas [accore?]
R. a Boyer	R. à Boyer Boyer's River
R. des Soldats	R. des Soldats Soldiers River
Pre R. des Sioux	Riv. des Sious Sious River
	Ecore des Cedres red Cedar bluffs
Entrepôt de la compagnie village des Mahas	Maha village Maha village
R. des Sioux	petite Riv. des Sious little Sioux River
	Riv. à Renville Renville River
R. a Loutre	
	Cap blanc White cape
ancien village des petits arcs	Riv. & village des petits os River & village of the little Osages
R. Sague	R. a Jacques James River
	I. à Sego Sego's Island
	I. au Sable Sand Island
	I. au bonhomme good man's Island
	village des panis Panis village
	I au Panis Panis Island
	Isle longua long view Island
	Maison de Mr Trudeau Mr. Trudeau's house
R. qui monte	
R. l'Eau qui court	Riv. qui courre [coure or court?] Rapid River
R. des Poncas village des Poncas	R. des Panis

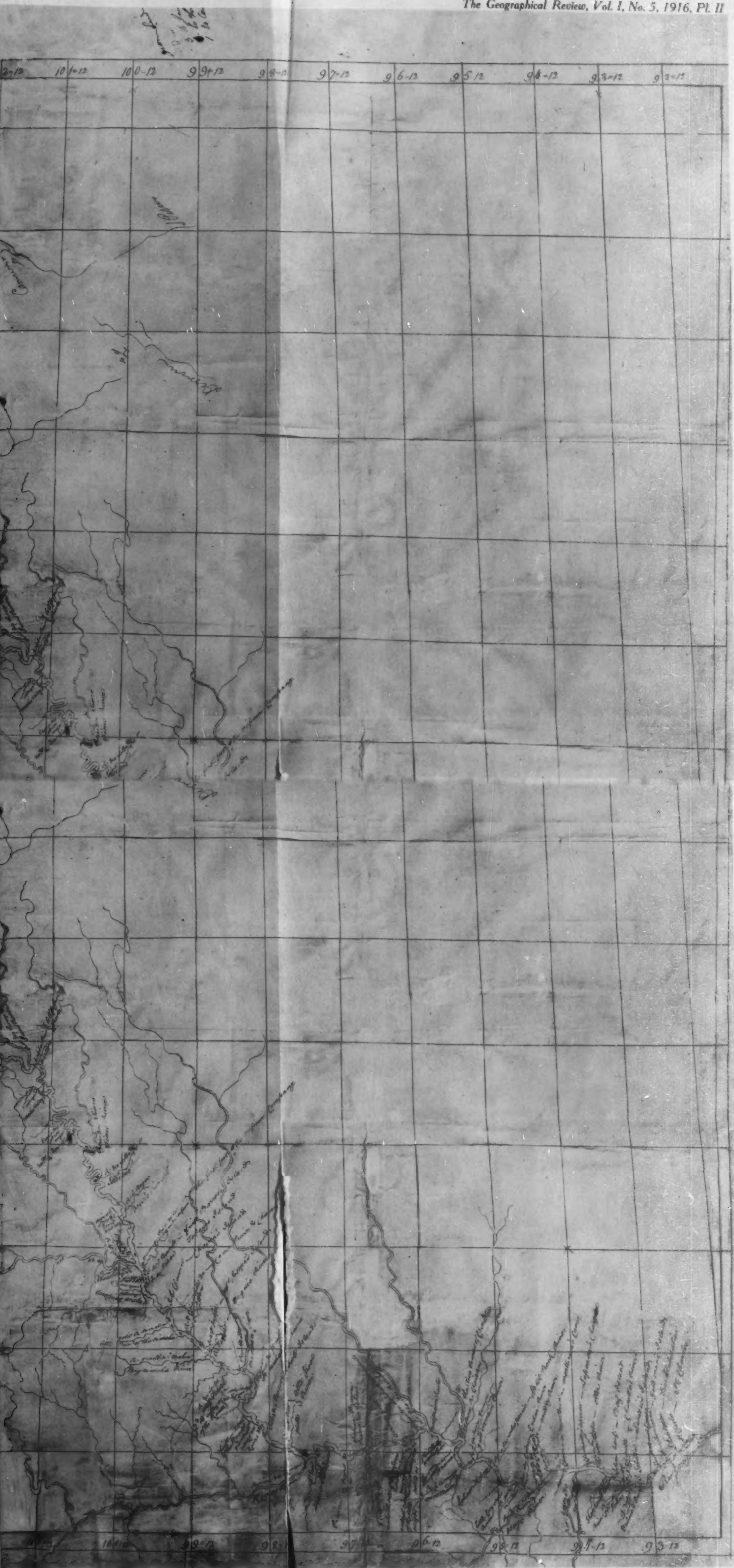
The promised comparison of the Evans map, as we will now designate it, with the second part of the Truteau "Journal," reveals a striking similarity in the matter of place names and in the location of Indian villages, but not more so than does a like comparison with the Perrin du Lac map. There are also some noteworthy discrepancies. In Truteau's "Journal" figure "la prairie du feu," "campe au pare," "nichenanbatonnois." Several Indian villages named in the "Journal" are indicated but not named on the map, in one instance, perhaps, because they were off the route of the Lewis and Clark expedition. In the matter of the various Sioux rivers, the "Journal" more nearly corresponds with the Perrin du Lac map than with the Evans. There are three such rivers on the Evans map, the "Riv. des Sious," the Little Sioux of today, the "Petite Riv. des Sioux," the Floyd

Perrin du Lac Map	*Indian Office Map*
J. des Basques	I. au Basques Basque Island
Second Poste de la Compagnie	
J. de Cedre	I. au Cedres Cedar Island
J. a Pierre	I. de periche Peter's Island
	I. au vase Muddy Island
	I. Bon Good Island
	Quatre Isle the 4 Islands
J. du Boeuf	Isle au boeuf Buffaloe Island
J. de Pâte	I. petite little Island
	Viau (?) Volcano old Volcano
R. Blanche	R. blanche White River
	Sious Island Isle des Sious
	I. bete puante pole Cat Island
	I. des deux Rivieres Island of the two Rivers
	Portage des Sious The Sioux carrying place
	R. du vieux Langlois old Englishmans Island
	I au bas de grande Island below the big bend
Grand detour	
	I. solitaire Solitary Island
	I. demi-lune half-moon Island
	I. de 3 Soeurs Island of the three Sisters
	I au Cabris Goat Island
	Mr Louisells House in the Winter 1803&4
	I au biche Elk Island
R. de Cheyenne	R. petit Missouri Little Missouri River
	I de longue vue long view Island
Ancien village de Ricaras	village des Panis Panis Village
R. de Chaguyenne	R. du Chien Dog River



This manuscript map of the Missouri River from St. Charles, Mo., near its mouth, to above the Mandan villages, in what is now North Dakota, was found among old files in the Office of Indian Affairs in Washington, D. C. It is probably the map which Jefferson sent to Meriwether Lewis in a letter dated January 13, 1804, prior to Lewis and Clark's departure on their expedition of 1804–1806. It, or the original of which it may be a copy, was presumably compiled in 1795 or 1796 by John Evans, a Welshman in the employ of the Missouri Company.

F ABOUT 1795 OR 1796



The map from which this photograph was taken measures along the outer border of the drawing 37½ inches (top; bottom, 36½ inches) by 28¾ inches and is on a scale of 1:1,630,000. From the present reproduction, which is on a scale of 1:3,670,000, a number of stains and creases have been obliterated in order to bring out the lettering more clearly. In other respects than this it is a facsimile.

of today, and "Riv. des Sious," the Big Sioux. Incidentally, Truteau remarks that there were a number of islands in the near neighborhood of the "Missouri Blanche" (White River), and such there are on the Evans map.

In recapitulation, it might be advisable to call attention again to the circumstance, so exceedingly consequential, that on the Indian Office map we find Mackay's "old french fort," his particular "river Souix," and his "old Vulcanoe." We also find Evans' "Little Missouri," his "Carp Island," but, unfortunately not his "remarkable places." We do have, however, definitely located for us, Truteau's ["Trudeau's"] House.

All these things bear witness to the great historical value of the Indian Office map, for, even if it should not be the original map sent by Jefferson to Lewis, it is the most detailed primary source for geographical knowledge of the Missouri River country that has yet been forthcoming. There is a bare possibility that it was made by or under the direction of Lewis and Clark themselves before they started up the Missouri, being to them a composite itinerary map.

UTAH, THE OASIS AT THE FOOT OF THE WASATCH

By MARK JEFFERSON

In the heart of the basin country of the western United States, between the Rockies and the Sierra Nevada, lies an elongated belt of forty-six cities and towns, the least of which has a thousand indwellers and the greatest, Salt Lake City, a hundred thousand. Between these cities the valleys are covered with green wheat fields, squares of alfalfa and plowed land, and clouds of pink every spring when the fruit trees bloom, with the ranches of the owners dotted between. This strip of human occupation in the midst of the wilderness is Utah, the best-defined geographic unit of American states. East of it is the empty wilderness of the Green River canyon country, bristling with crags and cliffs, high plateau remnants isolated by gloomy defiles, with no town of a thousand people till one comes to Grand Junction, Colorado, 140 miles away. West of it for 400 miles stretch the deserts of Utah and Nevada without settlement save for the one little town of Ely, at a distance of 150 miles. At the southern boundary of the state is a gap of fifty miles between the southernmost town of Utah and the northernmost town of Arizona, and there is a similar gap on the north between the towns of Utah and Idaho.

For the most part, the states of the Union are not geographic but purely political or politico-social units. There is no geographic break between Ohio and Indiana or betweeen Indiana and Illinois. The farms and fields are continuous across the boundary, the wood-lots cross it. If a river makes a part of the boundary it is for convenience, or was for the convenience of early administrators when the marking of boundaries cost more than most of the land was worth and the ready-made line of a river-bed was a gift of nature.

As a matter of fact a river, especially if it be of navigable size, does not at all separate the activities of men. A large city on a state boundary inevitably pushes its suburbs across such a river into another state or even into a foreign country. The real city of New York long ago expanded across the Hudson into Jersey City and Hoboken in New Jersey, simply because the river is vital to the life of the city as our great seaport and that vital organ nourishes one shore as well as another. So Philadelphia has expanded across the Delaware and the state boundary into Camden, St. Louis across the Mississippi into Illinois at East St. Louis, and Detroit across its river into Canada at Windsor. In the Old World, where states have acquired their boundaries by a long, slow growth, an important river is rarely part of a boundary, and the great cities stand astride their rivers within a single

administrative unit. In the eastern United States, if anything tells the traveler that he has passed from one jurisdiction to another, it is usually some product of legislation that has produced visible human works which extend only as far as the visible boundary. Generally human occupation flows uninterruptedly across the line. For the most part state boundaries are meridians and parallels, lines capable of being marked on the map even before a new country has been explored and readily established on the ground as soon as the cost can be covered. They are naturally in great vogue in all new lands, like Australia or inner Africa as well as America, which are subdivided on paper ahead of their actual occupation. As these lines have no inherent geographic character, but rather an astronomic one, the actual settlements, when they come, spread with the least possible heed to them.

But Utah is a group of homes without near neighbors. For hundreds of miles in every direction from Salt Lake City there are no other large towns. The Utah communities lie in a strip along the western base of the Wasatch, 350 miles long and only 50 wide. The irrigated lands of the state (Fig. 7) lie mainly in the same belt. They occupy 1,560 square miles, or about the same area as the town belt, which, according to the rough dimensions just given, would cover an area of 1,750 square miles. The political state is four or five times as wide. The traveler who crosses it by train has a long journey across empty spaces on either hand. Furthermore this compact isolated strip of settlements lies under the eastern bounding wall of a great depression in the western plateau country. The relief map (Fig. 1) shows this hollow in the plateau at the northwestern corner of the state of Utah. Its area is about 20,000 square miles. Its surface is everywhere less than 5,000 feet above the sea. Great Salt Lake lies at the lowest point of the basin, which was in ancient times filled by the fresher waters of Lake Bonneville, which overflowed to the Snake River valley to the northwest. It is observed that the northern towns of Utah all lie along the eastern border of this basin,—the southern ones at a slightly higher level, but, like the others, along the western foot of the Wasatch, which bounds the depression on the east. The map shows all the towns of the state that have more than 1,000 people, with the size in 1910 indicated by the symbols used.

On account of this situation at the border of a great depression in a dry country the name *oasis* is here applied to the state. For oases are essentially hollows in the desert where ground-water becomes available. Probably most minds react to the word "oasis" with a picture of a tuft of palms waving over a pool in the midst of desert sand. It is quite possible that no such pool exists in reality. It is probable that it would be difficult to maintain a pool in such a situation artificially. Oases occur in hollows for the same reason that water appears, in humid regions, when digging a well. The ground-water comes to the surface at the lowest point in its neighborhood.[1]

[1] Readers will find instructive descriptions in E. Desor's "La forêt vierge et le Sahara," Paris, 1879.

The word "oasis" is Greek and was applied originally to the hollows in the Libyan Desert of Egypt. Five of these were famous: Siwa, Bakharieh,

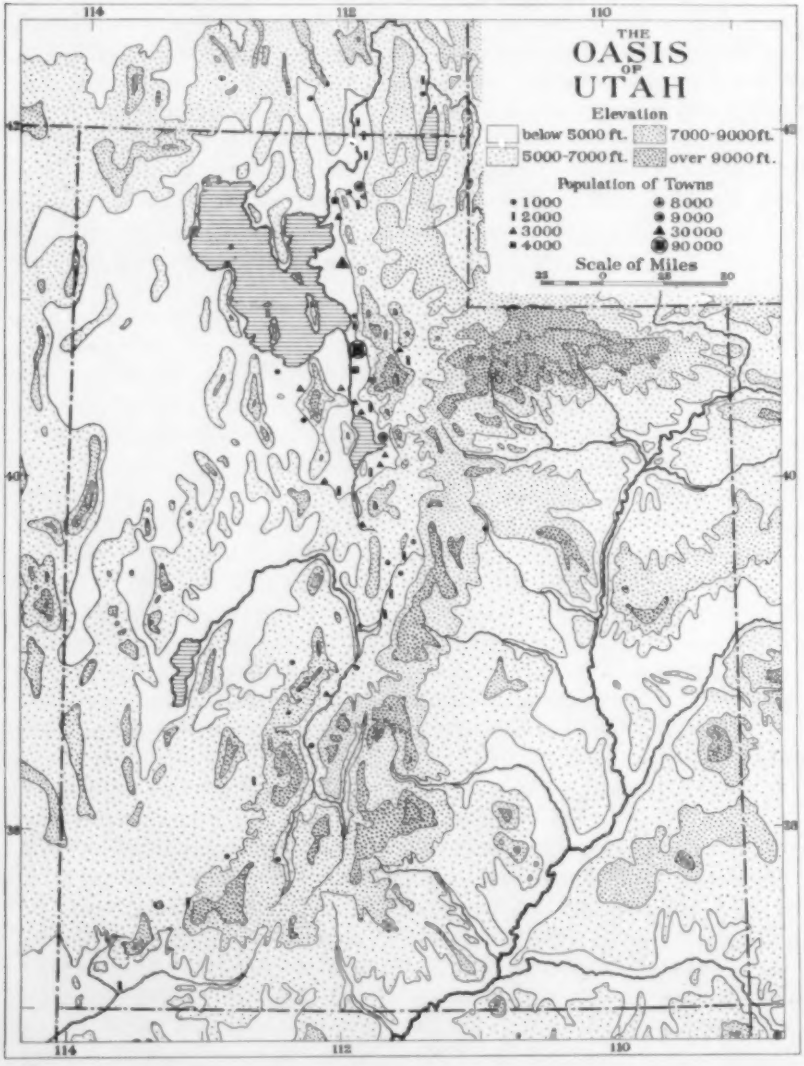


FIG. 1—The oasis of Utah: relief and cities. Scale, 1:4,300,000.
Relief is based on the contour map of the United States, 1:2,500,000, by the U. S. Geological Survey (1914); population of cities is based on the Thirteenth Census of 1910.

Farafra, Dakhel, and Khargeh, from 100 to 300 miles west of the Nile (Fig. 2). All of them, like the Nile flood-plain, are depressions far below the

surface level of the desert. They are all that give Egypt its pretended width on the political map, for apart from them the only habitable land—"sown" land—is the long Nile flood-plain, very narrow, at most a nine-mile-wide strip of cultivable land.

They are none of them oases as the word is commonly used in English today. Characteristic is the depth of the oasis floor below the desert and the sharpness of the bounding cliffs, brought out excellently by the view of the Algerian oasis Laghouat from Robin's "La Terre" (Fig. 3). Siwa is 426 feet below the desert; Farafra, 626; Dakhel, 1,059; and Khargeh, 984. Bakharieh is an excellent example (Fig. 4). The desert above it has an elevation of 800-900 feet above the sea; the floor of the oasis itself, at Bawiti, of 367 feet, a difference of over 400-500 feet. The traveler approaches the oasis without suspecting it,—across a stony or sandy level. Of a sudden he finds himself at the brink of a precipice, under which nestles the village, with bordering palm groves and millet fields extending a little farther out on the floor of the depression. Each village is at a spring or well, and the spring is fed by the ground-water of the desert, emerging at the foot of the cliff. There is only water enough to irrigate a small part of the depression. The total area of Bakharieh is 300 square miles, but only six could be cultivated at the time of Rohlfs's expedition (1873-74). From these six square miles the 2,410 inhabitants of Bakharieh drew their sustenance. The name oasis, however, applies to the whole depression, though it contains a number of wells at considerable distances apart and a number of villages. Bakharieh has six inhabited places, Farafra two out of fifteen watered spots, and Khargeh eleven. From the floor of such an oasis the ragged, encircling cliffs look like a low mountain range. Several of them have the name *jebel* (mountain), and Rohlfs's map is marked "Rohlfs Gebirge" to the northeast of the Farafra oasis.[2]

FIG. 2—Location of the five oases of the Libyan Desert, Siwa, Bakharieh, Farafra, Dakhel, and Khargeh, to which the Greek word *oasis* originally applied. Scale, 1:17,500,000.

[2] The data about the oases are taken from the account of Rohlfs's journey of 1873-74 (Expedition zur Erforschung der Libyschen Wüste, 3 vols., Cassel, 1875-76, Vol. 3: Physische Geographie und Meteorologie, bearbeitet von W. Jordan), because it is still an excellent source of information. Reference should also be had to the reports on the topography and geology of the oases published by the Geological Survey of Egypt (Survey Dept., Cairo), as follows: Bakharieh [Baharia], by John Ball and H. J. L. Beadnell, 1903; Farafra, by H. J. L. Beadnell, 1901; Dakhel [Dakhla], by H. J. L. Beadnell, 1901; and Khargeh [Kharga], by John Ball, 1900. Geographers now have easy access to what little is known of Egyptian geography in the six-sheet Map of Egypt on the scale of 1: 1,000,000 published by the Survey Department at Cairo.

The Utah towns at the eastern border of the Bonneville Basin and the basin itself, 20,000 square miles in area, are here likened to one of these oases of the Libyan Desert, the Wasatch being the eastern portion of the bounding wall. The irrigable land of this oasis of Utah has a population density of 239 people to the square mile, where the Libyan oases have 530 to the square mile of cultivated land,—not too great a discrepancy when the differences in the standards of American and Arab life are considered.

FIG. 3—The Algerian oasis of Laghouat. From Pl. VII, "La Terre: Ses aspects, sa structure, son évolution" by A. Robin, Larousse, Paris, 1902.
This view shows the cliffs, at whose foot lies the typical village with its cultivated area.

But the water of the Utah towns is not from wells and springs. It is stream water from the Wasatch, now well stored in reservoirs and economically applied to the soil. In general, rain comes of some sort of uplift to the air. Thus, mountains in the desert always have some rain from the uplift they give the winds. On the other hand descent warms air and favors evaporation rather than precipitation, and an interior basin has less rainfall because of the fact that air can only enter it by descent. The lowest

1909. The oases are shown on Sheets 1, Alexandria, and 3, Western Oases, and it is at once perceived that Rohlfs made a highly important contribution to the knowledge of the region. The Selima oasis of Sheet 5, Libyan Desert, was not visited by Rohlfs and is very vaguely depicted. For one thing no elevations are given, but its impressionistic contours show the same depression as in the great oases. The Map of Egypt allows an instructive contrast between the Nubian Desert, east of the Nile, and the Libyan Desert to the west, for all the oases are in the west. The Nubian Desert consists of mountain ridges up to 6,000 feet, with its low places from 600 to 1,500, while the western depressions, as has been shown, run down below sea level. The Nubian Desert abounds in slopes strong enough to wash into a great number of dry stream channels, the desert *wadies*. In these the rare wells occur, but permanently inhabited oases are not shown there.

point in the United States is Death Valley, 220 feet below sea level, and it has less than five inches of annual precipitation. The whole Great Basin region is arid, for the prevailing winds get into it by descent across the Sierra Nevada or the Rockies. This is a matter of general knowledge. It is also certain that the Wasatch has much rain and the Uintas still more. The details are shown on the rainfall map by Henry Gannett (Fig. 5),[3] which gives the Great Basin 10 inches a year, the Wasatch upwards of 20 inches, and the Uintas as much as 40 inches. The local observer at Salt Lake City, A. H. Thiessen, draws a different map (Fig. 6).[4] Mr. Thiessen says "The rainfall of Utah has been accurately measured at many stations in the valleys, and at a few moderately high stations, but none at the highest levels, either in the Wasatch or the Uintas. It varies from 6 to 25 inches annually at points between 2,800 and 7,000 feet, and it is probable that as much as 30 inches or more falls at some places at the higher levels. This great variation is due almost wholly to topography. The stations on the western slopes of the mountains receive more moisture than those on the eastern slopes, and stations near the mountains more than do those on the same slopes but farther away from the base of the mountains; stations at higher levels receive more than those at lower levels, as a rule; but stations at the same level on different sides of a mountain will receive different amounts, the one on the western side usually the more." If gages between 5,000 and 7,000 feet yield 7 to 25 inches of rainfall it is probable that at points toward 12,000 feet more than 30 inches falls. Certainly the mountain rainfall is heavy.

In theory, at least, Utah lies in the belt of westerly winds, and these westerly winds should be adiabatically cooled as they ascend the western slopes and deposit their moisture there. Records of the Weather Bureau appear to show that Salt Lake City has a prevalent *southeast* wind. The invaluable Annual Report of the Chief of the Weather Bureau for 1896-1897, for instance, gives for the average of the five years 1891-1895 at Salt Lake City—

2241 hours of southeast wind,
1883 " " northwest "
936 " " south "
888 " " east "
785 " " west "
682 " " southwest "
634 " " north "
561 " " northeast "

3690 hours of N.E., E., and S.E. winds, against—
3350 hours of N.W., W., and S.W. winds.

Such other years as are available appear to show the same feature of easterly winds somewhat distinctly predominant over westerly. However,

[3] From Pl. I, *U. S. Geol. Surv. Water-Supply Paper 301.* See also footnote 1 on p. 203 of the writer's article in the March *Review.*

[4] Leaflet entitled "Normal Annual Precipitation for Utah."

Salt Lake City's rainiest months, March, April, and May, had 785 hours of northwest wind to 460 of southeast. By the courtesy of the chief of the division of climatology of the Weather Bureau, Mr. P. C. Day, the writer is able to state that the wind at Salt Lake City seems to be in the northwest

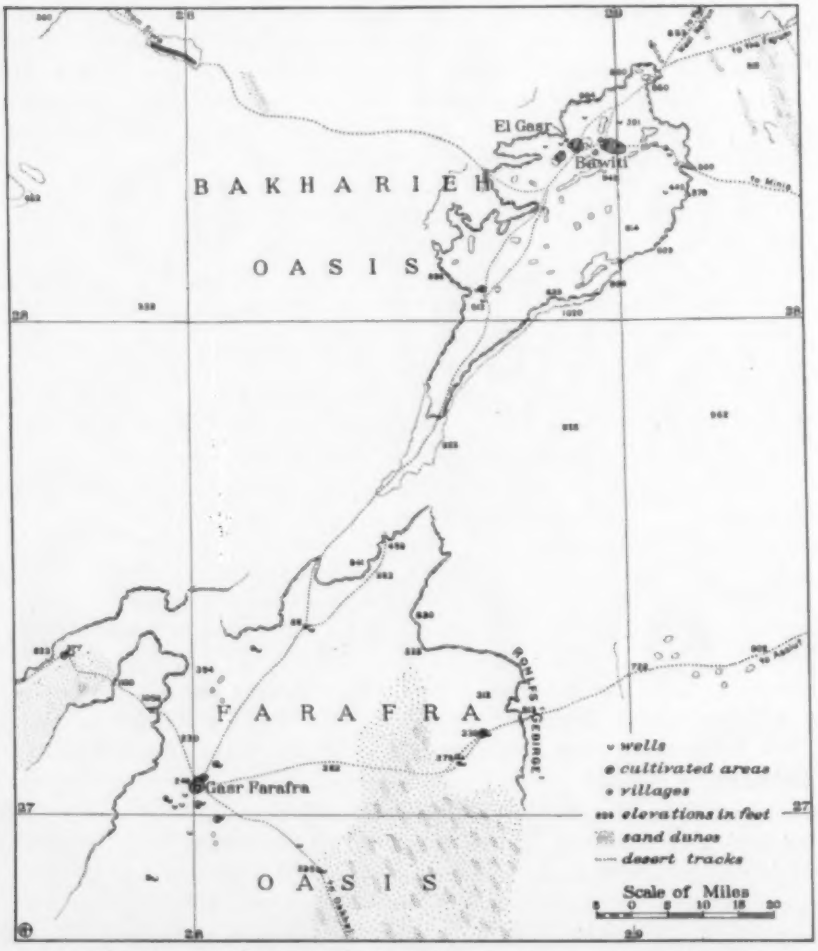


FIG. 4—The oases of Bakharieh and Farafra in the Libyan Desert. Scale, 1:1,540,000. Based on Sheets 1 and 3 of the Map of Egypt, 1:1,000,000, published by the Survey Department, Cairo, 1909 (for the original sources see footnote 2).

during most of the heavier rainfalls. Six of the "more important rainfalls" at that station were October 1 and November 18, 1910, April 5 and September 29, 1911, and May 30 and July 19, 1912. The respective rainfalls were 1.14, 0.70, 0.71, 0.85, 0.49, and 1.07 inches. While these rains were falling, the wind was in the northwest for 27 hours; in the north for 9; southwest,

6; west, 4; south, 4; southeast, 4; and east and northeast for one hour each. To put it another way, the total rainfall on these six occasions was: with a northwest wind, 2.71 inches; with north, 0.76; with southeast, 0.38; with southwest, 0.24; with west, 0.20; with east, 0.20; and with northeast, 0.03. If the six cases selected are at all typical, the northwest is the rain wind. It is puzzling to see the east wind accompanied by the same rainfall as the west wind, though both are small. That the northwest brings the greatest rain may well be because the longest axis of Great Salt Lake stretches in a northwesterly direction from the city. The wind must have a very low humidity when it comes to the lake and must take up much vapor from its surface to drop it again on reaching the mountain slope in the immediate suburbs of the city. But as the lake in turn must draw its waters from the Wasatch streams, it will not do to ascribe more than a part of the rainfall on the range from the evaporation from the surface of the lake. We should expect other stations to have their precipitation with all-west winds. In general the local observers are not able to state what winds prevail when rain falls.

The drainage of the west slope of the Wasatch is mainly caught in streams flowing north and south along the west front or among the western ridges. These are the Bear River flowing northward from Bear Lake into Idaho and then south again into the east arm of Great Salt Lake (which it has turned to fresh water now that the railway has built its causeway across), the Jordan northward from Utah Lake to Great Salt Lake, and the Sevier, which flows north to a point near the middle of the state, where it turns south again to Sevier Lake. Most of the basin of northwestern Utah is quite without running water. It is a surprise to find the eastern portion of the state much better supplied with permanent streams, in view of the greater rainfall on the western slopes called for by theory, and reported by observer Thiessen. In the southeast, where the precipitation is as small as in the west, the Green and Colorado Rivers receive a number of considerable tributaries from the eastern slope of the Wasatch, and these streams appear to carry constant water supplies, although they come from the dry side of the range. Any map of the rivers of Utah shows strikingly this preponderance of running water on the eastern side of the range. Probably the rainfall is not at all sharply limited to the western slopes. It is not good theory to suppose that rain caused by uplift on a west-facing slope will leave the east slopes completely dry. It is to be expected that some rain will pass the crest and feed rivers on the leeward side also. This is observed in the Cascades, the Sierra Nevada, and the Andes of Patagonia. If settlement is limited to the western foot of the Wasatch, it is not wholly on account of superior water supplies, but especially because of the greater amount of level ground with deep soils. The deposits of ancient Lake Bonneville and the wash from the mountains in more recent days have tended to cloak the western foot of the range with a mantle of fine rock

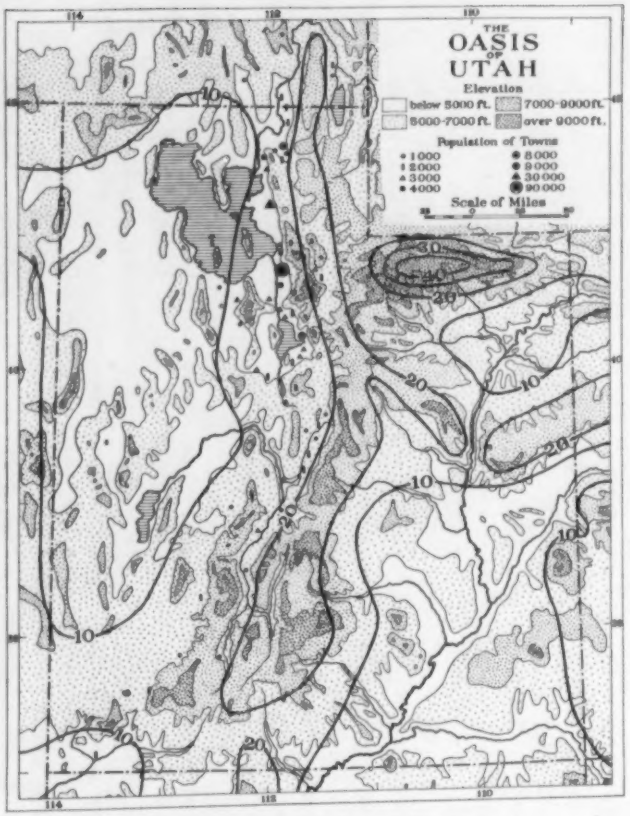


FIG. 5—Mean annual precipitation of Utah, according to Henry Gannett. Scale, 1:5,670,000. Based on Pl. I. *U. S. Geol. Surv. Water-Supply Paper 301*, 1912.

Mr. Gannett took the mountain contours and vegetation into consideration in drawing his isohyetals (see the March *Review*, p. 203 ff).

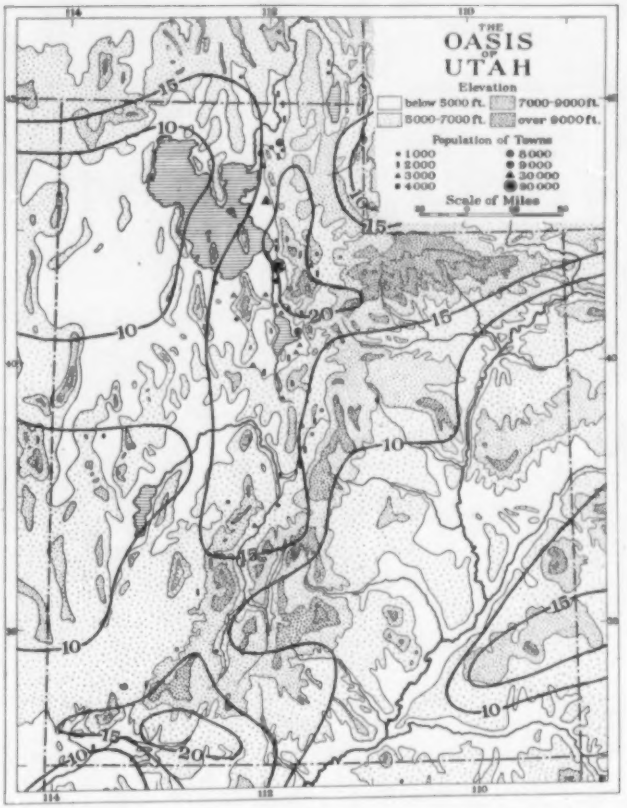


FIG. 6—Mean annual precipitation of Utah, according to A. H. Thiessen. Scale, 1:5,670,000. Based on a leaflet map entitled "Normal Annual Precipitation for Utah," about 1912.

Note on Fig. 6: This map is preferable to the rainfall maps of the U. S. Weather Bureau, because all data are included and none suppressed. It indicates rainfall in places as high as 20 inches where the Weather Bureau has but 15. Mr. Thiessen believes over 30 inches fall in the mountains.

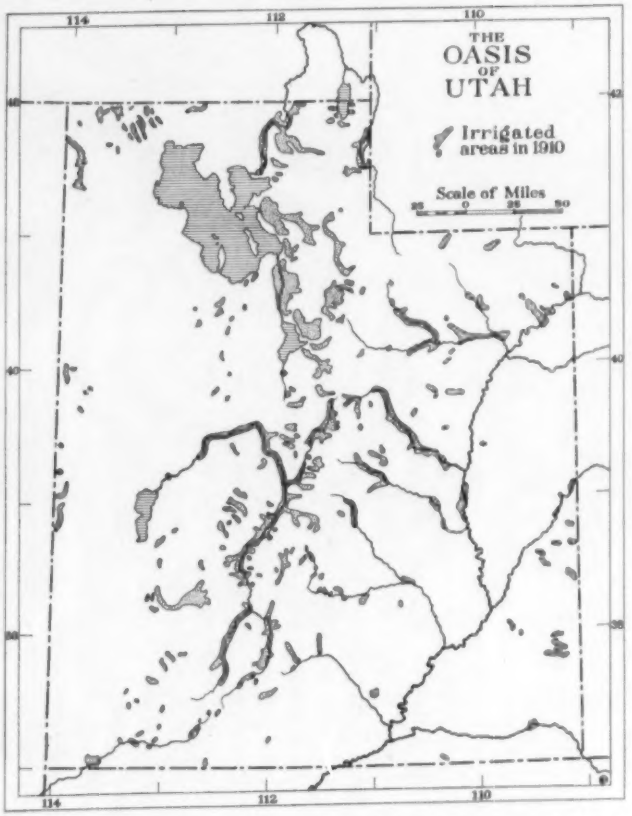


FIG. 7—The irrigated lands of Utah in 1910. Scale, 1:5,670,000. Based on Fig. 2, Pl. 404, Statistical Atlas of the United States, Bureau of the Census, 1914.

It is apparent that the irrigated lands lie mainly along the valleys at the west front of the Wasatch, like the cities in Fig. 1.

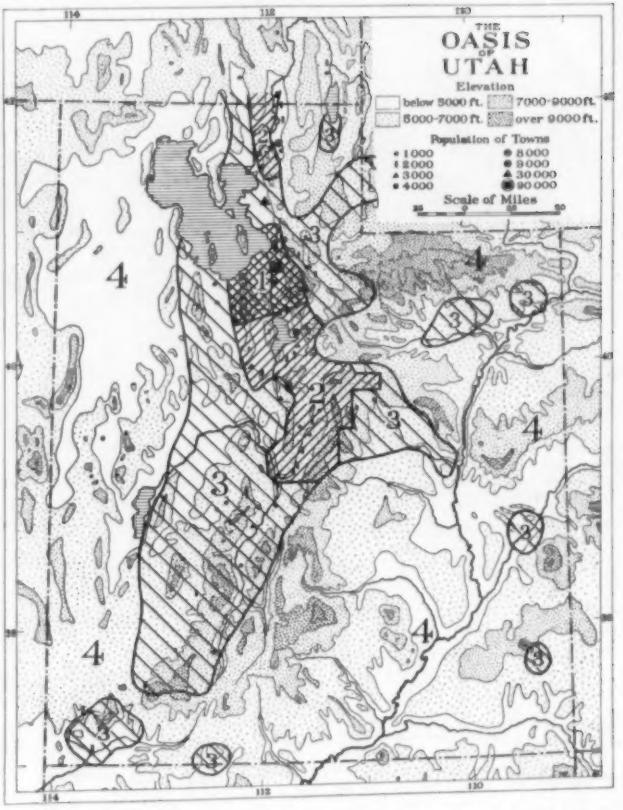


FIG. 8—Distribution of rural population in 1910. Scale, 1:5,670,000. Based on Pl. 15, Statistical Atlas of the United States, Bureau of the Census, 1914.

Note on Fig. 8: All the cities of 2,500 or more inhabitants have been subtracted from the population before computing the densities. Grade (4) has less than 2 people to the square mile; grade (3), from 2 to 6; grade (2), from 6 to 18; grade (1), from 18 to 45. The map shows the main distribution of people along the western front of the Wasatch, but includes some units of absolute desert in area (3).

waste which becomes a fertile soil as soon as water is added to it. The deep canyons of the Green and the Colorado cause the whole eastern region to be deeply dissected. Level expanses are very small there, and the finer waste has been carried off to the sea.

The representation of the settlements of a state by city symbols only, such as we have used here (Figs. 1, 5, 6, and 8), is novel and calls for brief comment. The best-known population maps for the United States are the very beautiful ones published by the Federal Census Bureau. The Utah portion of the map for 1910 is here roughly reproduced in Figure 8, which uses black shading and numbers for the brown shades of the original. The numeral 4 represents areas where the population per square mile is less than 2; 3, from 2 to 6; 2, from 6 to 18; and 1, from 18 to 45. Although the map is quite inadequate to represent the actual distribution of population, it does show that the population is mainly along the western foot of the mountains, with empty spaces westward and only very tiny scattered bits of settlement towards the east. It is inadequate because it represents only the "rural population, omitting all communities of over 2,500 people." The cities, if of 8,000 people, are represented by dots on the original map. They are Salt Lake City, Ogden, and Provo. There remain eleven cities between 2,500 and 8,000 population without representation on the map as the Census draws it, either by shading or dots for cities. These are Brigham, Logan, Park City, Murray, Tooele, Bingham, Lehi, American Fork, Springville, Spanish Fork, Nephi, and Richfield,—in all 34,086 people, nine per cent of the people of the state. Even if the whole population were used, the values obtained by dividing the population of a Utah county by its area are unsatisfactory, for the counties are so large and so often include much uninhabited wilderness that we may not think of their population as grouped evenly over their surface. The omission of these towns from the 1910 map is probably a mistake that arises from the fact that the Census has this decade revised its definition of rural communities as those with less than 2,500 people instead of 8,000, as was the former standard of discrimination. The 8,000 has still been retained, however, as the smallest size of cities to locate on the map with dots proportional to their size, but the population of all cities over 2,500 was subtracted from their counties before computing population density.

The separation of city from country that the Census makes is not justifiable. The rural and urban population are closely related, not merely in their origin but in all the activities of their daily life. The rural occupation of the land, the cutting of forests and putting fields under tillage has made little cities grow up all over the country and made the big ones yet bigger. The form that economic development has taken demands that much work which was formerly done on the farm be now done in cities. This is not merely in the manufacture of agricultural implements—though these are so important that they have made one man's labor on a farm go from sixteen

to eighteen times as far as it did fifty years ago—, but in the preparation of food and clothing and sorting and classifying and storing for sale. If you double the rural population in any district it will quickly cause the urban centers near by to more than double, for the country needs the cities as much as the cities need the country. For example, Michigan and Wisconsin in 1870 had between them seven cities of more than 10,000 inhabitants. By 1910 the population of the two states had a little more than doubled, and there were 42 cities of that size! In the whole district of the Great Lakes in the same period, the cities had increased from 28 to 102. It is impossible today to conceive of the country apart from the city, so completely has it lost its one-time independence. They form an organic unit today, the country producing from the soil, but supplying itself with clothing, furnishings, much of its food, and a great variety of mechanisms from the city, which not merely eats the food the country supplies, but is busily engaged in sorting and distributing the products of both city and country to the consumers everywhere, as well as manufacturing them into other forms.

Instead of attempting to represent the actual distribution of people in the country by subtracting the city dwellers from the total population and representing the residue as the real occupants of the land, progress is to be made by constructing city maps in greater detail than have been usual yet and giving their symbols some connotation of size more legible and graphic than the customary methods allow. A map of cities is a map of foci of human activities. If it can be given a note of relative magnitude in the very symbols that locate the towns, such a map will express admirably the intensity with which men have occupied the ground. A little city must be little at a glance and a big one, big.

No use of type conveys the idea well enough, and the names themselves mask the expression of the map too much to be tolerated. If names must be added a key map should be made for the purpose. A little spot and a big one go some distance toward the expression desired, but only a few sizes can be thus discriminated. The solution is to aid the suggestion of size with that of *shape*. The device used here simply calls for counting corners, a little dot for a thousand, an elongated one for 2,000, a triangle for 3,000, a square for 4,000, an open circle for 5,000. The same symbols, enclosed in a circle, express the next four grades. Practice shows that the eye instantly distinguishes these values. A second size of symbols for cities ten times as large and running through the whole scale renders close size indication possible. The thought is throughout that the cities crown the agricultural occupation of the land and must multiply and must grow in size as more and more land is brought into occupation, or even as cultivation becomes more perfect and more intense. The spacing of the little cities is fixed by the extent to which country areas are improved, and the spacing of great ones is found to depend closely on the spacing of the smaller ones. It is for

this reason that the map of Utah's irrigated lands accords so closely with that of her cities.

The scene that unfolded itself before Brigham Young's eyes that July morning in 1849, as he emerged from the pass in the Wasatch above the prairies green with the waters of the mountain creeks, had promise for him of homes for his faithful followers, but it contained also the germ of the unique group of cities and towns strung along the mountain foot today.

THE ERUPTION OF YAKE-DAKE, JAPAN, IN 1915

By SIDNEY POWERS, Ph.D.

The "festoon islands" of Japan form a portion of the girdle of volcanoes which encircles the Pacific. Of the 165 volcanoes which have been found in Japan, 54 are classed as active. These volcanoes can be grouped into a number of volcanic lines, of which the one stretching from Fuji-yama southward through the Bonin Islands is one of the most conspicuous. It is on this line, north of Fuji-yama (Fig. 1), that Yake-dake is situated, in the midst of the Japanese Alps, a granite range of mountains 7,000 to 10,000 feet in height. Within ten miles of Yake-dake there are two quiescent volcanoes, Norikura-dake and Kasa-dake.

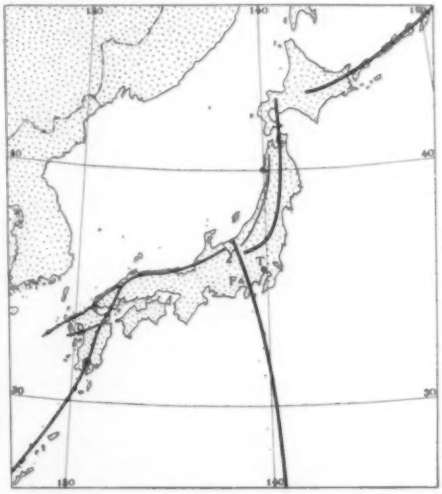


FIG. 1—Outline map of Japan showing the position of Yake-dake (Y) with respect to Tokyo (T) and Fuji-yama (F). Scale, 1:32,000,000. The principal volcanic lines are shown, based on a map in Ishizu's "The Mineral Springs of Japan," Tokyo, 1915 (see March *Review*, p. 239).

An eruption of Yake-dake, accompanied by a fall of ash over the surrounding region and a mud-flow, partly blocking the Azusagawa River, took place on June 6, 1915. In August the writer visited the mountain during a trip to the Orient for the purpose of studying volcanoes and was able to gather the following information concerning the eruption.

Yake-dake is 125 miles northwest of Tokyo and is reached from the city of Matsumoto, 150 miles from Tokyo by rail. From Matsumoto a wagon called a *basha*, a sort of springless "one-horse shay," is taken for 13 miles to a settlement called Shimashima, and from there it is necessary to walk with one's "boy" (interpreter) over the Tokugo Pass of 7,000 feet elevation into the valley of the Azusagawa River to a small inn at Kami-kochi, a distance of about 19 miles. This inn is situated near a hot spring at an elevation of 4,900 feet in a V-shaped valley where snow persists in large quantities in the ravines throughout the year.[1]

From Kami-kochi the volcano, rising to a height of 8,000 feet, is three

[1] This general region has been described by the Rev. Walter Weston in an article entitled "Exploration in the Northern Japanese Alps," *Geogr. Journ.*, Vol. 46, 1915 (Sept.), pp. 188-200.

miles away. It is a steep-sided mountain with a rounded top, composed of coarse-grained andesite. Smoke issues from the crater near the summit and from the newly opened crater on the east side. There are two summits, each composed of massive andesite, and between them are two craters, one of which is quiescent, the other emitting steam in large quantities. The recent eruption as witnessed from Kami-kochi is described by J. M. Davis as follows:

Earthquake shocks with increasing intensity were felt at 7 o'clock on the morning of June 6. A strong concussion was felt as the volcano was split open on the east side from the base to within 1,000 feet of the top. The explosions hurled out rocks, ashes, mud, steam, and smoke with a tremendous reverberation of sounds, as the massive granite cliffs on the opposite side of the valley are only a mile away. Ashes fell at Kami-kochi, and the whole valley was enshrouded in a heavy cloud of smoke. The activity continued all day with frequent earthquake shocks, the roar of escaping steam, and the crash of falling trees and rocks. A row of new craters was opened along the new fissure, the principal crater being at an elevation of 7,000 feet. The ash and mud broke all the branches of the trees in the neighborhood, and a large mass of mud and boulders slid down the steep slope into the valley below, damming the stream.

Toward evening of the first day a heavy rain began to fall and continued all the next day. Minor explosions from the craters continued also throughout the second day, and more landslides took place. No further information is available, as it was quite impossible for the writer to secure satisfactory information from the natives about this or any other Japanese volcano, partly because the interpreters were not familiar with volcanic activity, but principally because the natives have no interest in volcanoes, even those near by.

An examination of the mountain in August showed a row of small craters at the upper end of the newly formed fissure. These craters were arranged along the fissure, with several small pits in each depression. With the exception of those in the uppermost crater, the pits were inactive, and many were filled with water. The upper crater was about 100 feet long and 30 feet wide at the base, with a wall toward the mountain rising 300 feet and a ridge on the lower side between this and the next crater 70 feet high. Steam was rushing with a hissing sound from a hole ten feet in diameter in the upper crater and sweeping up toward the top of the mountain as seen in Figure 2. The sides of the craters and the surrounding region were covered with gray mud, which was at least three feet thick at the upper crater. The trees on the sides of the mountain were all killed, but some of them were killed by an eruption "about 28 years ago." A quarter of a mile below the main crater, the ash covering the fissures running down the mountain was one foot thick, and at the Kami-kochi inn it was one-eighth of an inch thick. Steam was issuing in many places from the fissures below the summit crater.

FIG. 2.

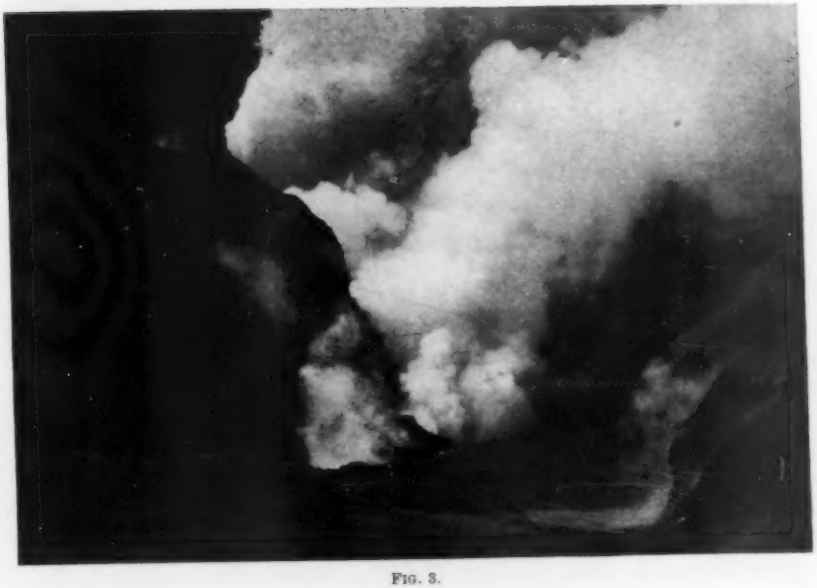


FIG. 3.

FIG. 2—The new crater of Yake-Dake, looking toward the summit of the mountain. The steam comes out of a hole about ten feet in diameter. The mud-flow which dammed the Azusagawa River started from the slope on the right.

FIG. 3—The main crater shown in Fig. 2, taken from the base of the newly opened fissure which extends down the mountain.

The damming of the Azusagawa River by a mud-flow has formed a temporary lake (Fig. 4), half a mile in length, but of no great depth. The stream is rapidly wearing down the obstructing débris, and in relatively few years only a marsh will remain. There is no new lava in the material which slid down the mountain, and no bombs indicative of fresh lava were observed anywhere on the mountain, so the eruption may represent merely a series of steam explosions such as caused the destruction of the mass Ko-Bandai of the volcano Bandai San in 1888.

In regard to the previous history of the volcano, Milne[2] reports that it was active in 1875, but the Japanese students at Kami-kochi know of only

FIG. 4—The new lake formed by a mud-flow damming the Azusagawa River. The mountain in the distance is Hodaka-dake, and near its base is the hot spring and inn Kami-kochi. The snow remains in these valleys all summer, for the elevation of the lake is about 4,900 feet and the top of Hodaka-dake is 10,250 feet.

two previous eruptions, one between 28 and 33 years ago, in which the steaming crater at the summit of the mountain was formed, and the other about 100 years ago, in which the extinct crater at the summit was blown out. The original form of the mountain is not easy to determine on account of the extensive erosion which has taken place. There appear to be solid masses of andesite at the two summits, which are now separated by two craters, and, if these masses were originally continuous, the form would suggest a volcanic dome similar to O-Usu at the volcano Usu-dake in Hokkaido (Yezo). The summits of the other Japanese volcanoes visited differ from Yake-dake in being composed principally of ash lapilli and bombs.

[2] John Milne: The Volcanoes of Japan, *Trans. Seismol. Soc. Japan*, Vol. 60, 1886.

THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

There has been a growing feeling among teachers that there should be an organization devoted to advancing the teaching of geography. As a result of discussion at the meeting of the National Education Association in 1914, and of extensive correspondence, the desirability of forming such an association, together with a general plan of organization, was presented to the Association of American Geographers at their Chicago meeting in December, 1914, and met with their hearty approval. Professors R. E. Dodge, R. H. Whitbeck, and C. R. Dryer were delegated as a committee to co-operate with those who had taken the initial steps. This committee was enlarged to include Professors L. O. Packard, Charles C. Colby, and George J. Miller, and thereupon proceeded to seek the co-operation of others in creating the National Council of Geography Teachers.

The first meeting of this committee was held in Chicago in December, 1914, and the general plan of organization was decided upon. It was the opinion of the committee that the greatest immediate good could be accomplished by securing the co-operation of leaders in each state who would assume the responsibility of organizing a state council of geography teachers. Representatives from each state council could then constitute the board of directors of the national council. In accordance with this plan the committee requested a geographer in each state to organize a state council. In those states in which no geographer was known to the committee the state department of education or the state university was requested to recommend someone to take charge of the work.

The hearty response from all parts of the United States was most encouraging. In some states officials of the state department of education or a city superintendent have assumed the responsibility of organizing an association of geography teachers. This indicates a keen appreciation among school officials of the need for such an organization and of the splendid opportunity to do constructive work. Leaders have been secured in thirty-eight states (see map), and the enthusiasm and prompt activity of many has been most encouraging. Sixteen leaders have completed organizations in their respective states (Ohio has been added since the map was prepared). In nearly all these states meetings have been held and programs have been given. The attendance at these first meetings has been very gratifying, varying from a dozen to more than 350. Ten other leaders report (to date) that their state organization will be complete within a year. It is likely, therefore, that by the end of another year state councils of geography teachers will be actively at work in nearly three-fourths of the states. In some states local societies have been formed, e. g. the Bay Council of Geography Teachers in California and the Minneapolis and St. Paul Associations in Minnesota. In several other states local organizations of a geographic character but not emphasizing the teaching phase of the subject were already in existence.

In most states the organization of geography teachers has been established as an independent association but affiliated with the state teachers' association and meeting with it. In some states it is a section of the larger teachers' association, and in others it is a part of the state science association. Organization as a part of the state teachers' association or affiliation with it seems to be the more desirable plan. Either of these plans enables the geographers to interest a much larger number of teachers and school officials, to carry their influence more completely throughout the state, to increase the funds available for constructive work, to lessen the number of separate meetings, and to make available the enthusiasm of larger numbers.

Work of great value can be accomplished by each state organization. Within a few years there should be a council of geography teachers in every state and it should undertake some definite task, the completion of which will advance the teaching of geography

in the schools of that state. The Bay Council of Geography Teachers of California has already undertaken such a task. They are now at work on "Materials and Methods of Map Work in the Grades and High Schools." The Minnesota state association will undertake the preparation of a course of study for the elementary schools of the state. It is probable that other associations are planning work of similar type.

By the generous co-operation of the publishers of the *Journal of Geography* that journal has been made the official organ of the National Council and will be included with the annual dues of one dollar. In addition the American Geographical Society has tendered assistance of great value. This society publishes in its monthly magazine, the *Geographical Review*, articles of inestimable value to every teacher of geography. From time to time appropriate articles will be sent to each member of the National Council of Geography Teachers. Membership fees may be sent to the Treasurer, Mr. Vernor

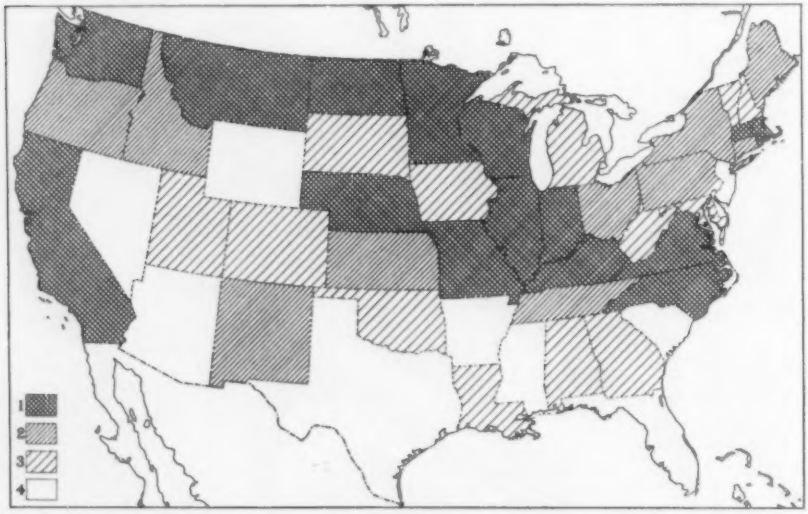


FIG. 1—Progress in organization of state associations of geography teachers during 1915.
1—State organization completed (Ohio has been added since the map was prepared).
2—State organization will probably be completed in 1916.
3—Leaders have been appointed.
4—No leader secured.

C. Finch, University of Wisconsin, Madison, Wis. Probably no other association of teachers offers so much of value to its members for so small a fee.

The final plan of organization of the National Council of Geography Teachers was worked out at the meeting in Washington in January of this year. The constitution provides for a Board of Directors, an Executive Committee, and executive officers. The Board of Directors consists of fifty members made up of (a) representatives of the affiliated associations of geography teachers, and (b) members at large. The Executive Committee consists of nine members, three of whom are to be chosen annually, and the executive officers are a president, two vice-presidents, a secretary, and a treasurer. The administration of the affairs of the Council are in the hands of the Executive Committee and the executive officers.

The officers chosen for the year 1916 are as follows: President, Richard E. Dodge, Teachers College, New York City; First Vice-President, Albert P. Brigham, Colgate University, Hamilton, N. Y.; Second Vice-President, Charles R. Dryer, Fort Wayne,

Ind.; Secretary and Chairman of the Executive Committee, George J. Miller, State Normal School, Mankato, Minn.; Treasurer, Vernor C. Finch, University of Wisconsin, Madison, Wis.

The Executive Committee consists of the following:

George J. Miller, State Normal School, Mankato, Minn.; Richard E. Dodge, Teachers College, New York City; Charles R. Dryer, Fort Wayne, Ind.; R. H. Whitbeck, University of Wisconsin, Madison, Wis.; L. O. Packard, Boston Normal School, Boston, Mass.; James F. Chamberlain, State Normal School, Los Angeles, Cal.; Charles C. Colby, Peabody College for Teachers, Nashville, Tenn.; F. V. Emerson, University of Louisiana, Baton Rouge, La.; N. A. Bengtson, University of Nebraska, Lincoln, Nebr.

The Board of Directors consists of the following: Jane K. Atwood, State Normal School, Emporia, Kan.; George A. Barker, State Teachers College, Greeley, Colo.; N. A. Bengtson, University of Nebraska, Lincoln, Nebr.; C. T. Boggess, State Normal School, West Liberty, W. Va.; Dr. Isaiah Bowman, Director, American Geographical Society, New York City; Robert M. Brown, State Normal School, Providence, R. I.; J. E. Buchanan, State Normal School, Cheney, Wash.; E. J. Cable, State Teachers College, Cedar Rapids, Ia.; Frank Carney, Denison University, Granville, O.; James F. Chamberlain, State Normal School, Los Angeles, Cal.; W. W. Clendenin, Wadleigh High School, New York City; Dr. Collier Cobb, University of North Carolina, Chapel Hill, N. C.; C. C. Colby, Peabody College for Teachers, Nashville, Tenn.; Sumner W. Cushing, State Normal School, Salem, Mass.; President C. W. Daugette, State Normal School, Jacksonville, Ala.; Dr. F. V. Emerson, University of Louisiana, Baton Rouge, La.; O. W. Freeman, Fergus County High School, Lewiston, Mont.; Grant E. Finch, State Normal School, Dillon, Mont.; R. P. Green, State Normal School, Bowling Green, Ky.; Dr. R. S. Holway, University of California, Berkeley, Cal.; Mark Jefferson, State Normal School, Ypsilanti, Mich.; President Willis E. Johnson, State Normal and Industrial School, Aberdeen, S. Dak.; Loulie C. Kelley, John Marshall High School, Richmond, Va.; Frank Merrill, State Normal School, Athens, Ga.; L. O. Packard, Boston Normal School, Boston, Mass.; Dr. A. E. Parkins, University of Missouri, Columbia, Mo.; E. E. Philbrook, State Normal School, Castine, Me.; C. J. Posey, University of Minnesota, Minneapolis, Minn.; C. E. Pratt, State Normal School, New Britain, Conn.; Ernest E. Race, State Normal School, Baltimore, Md.; Joseph Reed, State Normal School, Lewiston, Idaho; Dr. G. B. Roorbach, University of Pennsylvania, Philadelphia, Pa.; Dr. R. D. Salisbury, University of Chicago, Chicago, Ill.; B. H. Schockel, State Normal School, Terre Haute, Ind.; Howard E. Simpson, University of North Dakota, Grand Forks, N. Dak.; Bolton Smith, Memphis, Tenn.; James Smith, Austin High School, Chicago, Ill.; Dr. Warren D. Smith, University of Oregon, Eugene, Ore.; Mabel Stark, State Normal University, Normal, Ill.; C. H. Taylor, University of Oklahoma, Norman, Okla.; Alice Wessa, State Normal School, Buffalo, N. Y.; R. H. Whitbeck, University of Wisconsin, Madison, Wis.; G. H. Whitcher, State Department of Education, Concord, N. H.; Alvan N. White, State Superintendent of Education, Santa Fe, N. Mex.; W. H. Young, Superintendent of Schools, St. Johnsbury, Vt.; Anna Youngberg, University of Utah, Salt Lake City, Utah.

The purpose of the National Council, as stated in its constitution, is to increase the effectiveness of geography teaching in the schools of America. It therefore wishes to do everything possible to assist state or local associations. The Secretary will appreciate any suggestions that have as their object the bettering of geography teaching, or suggestions of ways in which the National Council may be of assistance. He will be glad to receive the names and addresses of teachers who are interested in geography.

GEORGE J. MILLER.

THE THIRD JOINT MEETING OF THE AMERICAN GEOGRAPHICAL SOCIETY AND THE ASSOCIATION OF AMERICAN GEOGRAPHERS

The third joint meeting of the American Geographical Society and the Association of American Geographers was held in New York on April 14 and 15. The sessions occupied Friday morning and afternoon, April 14, and Saturday morning, April 15, and were held at the Hispanic Society, in the same quadrangle as the building of the American Geographical Society. The meeting was called to order on Friday morning by President Greenough. Vice-President J. Russell Smith of the Association presided. The program consisted of a limited number of longer papers of general interest, with ample time for discussion. Following is a list of titles and speakers:

LEON DOMINIAN: The Geographic Foundation of Turkey's World Relations.

MARY VERHOEFF: The Kentucky River in Relation to the Kentucky Mountains.

HENRY B. BIGELOW: Oceanographic Explorations off the East Coast of the United States.

H. C. TAYLOR: Economic Factors Influencing the Geographical Distribution of Crops and Livestock in the United States.

A. HAMILTON RICE: Explorations in the Northwest Amazon Valley.

ALBERT P. BRIGHAM: The Physiographic Provinces of New York State.

HARRISON W. SMITH: Personal Experiences in the Society Islands and Borneo.

ERNEST P. GOODRICH: Some Geographic Problems Incident to the Growth of a Great City—New York.

Miss Verhoeff's paper dealt with the anthropogeography of the Kentucky River basin, with special reference to the history of settlement. This study is an outgrowth and continuation of her previous investigations along similar lines (The Kentucky Mountains: Transportation and Commerce, 1750 to 1911, *Filson Club Publs. No. 26*, Louisville, 1911; reviewed in *Bull. Amer. Geogr. Soc.*, Vol. 44, 1912, p. 779); it will be published in the same series in complete form.

Doctor Bigelow gave an account of the oceanographical work of the U. S. Bureau of Fisheries in the Gulf of Maine—the name given to the embayment of the Atlantic enclosed between the peninsulas of Massachusetts and Nova Scotia. Although this appropriate term to designate a distinct section of our Atlantic waters has been employed on U. S. Coast and Geodetic Survey charts at least as early as 1864 (Cape Sable to Sandy Hook, 1:1,200,000; and Chart No. 1,000, 1908), and is commonly accepted on the Continent (see Pl. 200-201, Andree's Hand Atlas, 6th edition, 1914), it is only recently coming into general use among American geographers (see also G. C. Curtis' use of it in *Bull. Amer. Geogr. Soc.*, Vol. 45, 1913, p. 413, and map between pp. 420 and 421).

The suggestive feature of Doctor Taylor's paper was a series of diagrams illustrating "crop competition." A set of vertical heavy black lines resting on a horizontal line represented the number of hours devoted each day at the place of observation to the cultivation and harvesting of a given crop, the height of the vertical lines being made proportional to the number of hours of cultivation and the horizontal line representing the time progression. By selecting typical localities and applying the device to the staple crops of the region, the diagrams thus showed at a glance which crops could be "dovetailed" to insure the best distribution of labor and the most rational form of mixed farming.

Doctor Rice's paper dealt in a most interesting way with his pioneer exploration and survey of the Inirida, Içana, and Uaupes Rivers in a region which, up to the time of

his surveys, had been quite unknown to science. Doctor Rice had already announced his results to the members of the Royal Geographical Society (see his addresses published in Vols. 35 and 44 of the *Geogr. Journ.*), but it had not before been the pleasure of an American geographic audience to hear his latest report.

Professor Brigham presented an original subdivision of New York State into physiographic provinces. His map was strikingly similar to the New York section of the United States map prepared by the Association's Committee on Physiographic Provinces (see the note in this number under "Geographical Record"). Professor Fenneman pointed out in discussion that this similarity to a map independently constructed tended to confirm the committee's results.

Mr. Goodrich's paper contained abundant material for the study of that most complex and concentrated unit of human geography, the city. The speaker projected on the screen a series of maps by the Committee on the City Plan (whose report is noticed in this number under "Geographical Publications"), which represented such topics as the percentage of area covered by buildings; population density; "night" and "day" population, illustrating daily migration from the residential to the business districts and back; transportation; "time zones," or isochronic belts, showing for any given section of the city the time it takes to reach the center; etc.

In addition to the announced papers Prof. Nevin M. Fenneman spoke briefly on the map of the physiographic provinces of the United States, prepared by a committee of the Association, detailed reference to which is made elsewhere in this number. It was also announced that, in connection with the work of the committee, the U. S. Geological Survey had decided on a new policy of officially recognizing physiography in its publications. In the past the references to this subject, incidental and subsidiary, have not been scrutinized by a specialist. Henceforth they will be edited by a physiographer and receive as careful attention as the sections devoted to other phases of geology.

As in previous years, there was an exhibition of maps at the American Geographical Society's building. The subjects illustrated were economic geography and the European war. On Friday evening, Dr. E. L. Stevenson, Acting Director of the Hispanic Society, spoke informally on "Some Early Maps and Their Geographical and Historical Significance," illustrating his remarks with specimens from the rich collection of the Hispanic Society.

At the social gathering of the Association members on Thursday evening at the Park Avenue Hotel, various topics of general interest were brought up, including the desirability of accelerating the production of the topographic map of the United States. Without criticizing the admirable work of the U. S. Geological Survey, Professor W. M. Davis pointed out that only 40 per cent of the national domain has been surveyed (see February *Review*, pp. 139-140). Ways and means of expediting the work were discussed, especially the means of securing larger Congressional appropriations, and a petition to that effect was circulated during the meeting for the signatures of the members.

Luncheon on Friday and Saturday was served in the American Geographical Society's building. On Friday the speaker was Major-General Leonard Wood, Commander of the Department of the East, who testified to the military necessity of a topographic map for the whole United States and then spoke on the general subject of preparedness.

Twenty-two members of the Association, including several members from the Middle-West and South, were present at the meeting, as follows: Henryk Arctowski, O. E. Baker, Isaiah Bowman, A. P. Brigham, R. M. Brown, Collier Cobb, S. W. Cushing, W. M. Davis, R. E. Dodge, Leon Dominian, C. R. Dryer, O. L. Fassig, N. M. Fenneman, J. P. Goode, R. M. Harper, W. L. G. Joerg, D. W. Johnson, Lawrence Martin, W. G. Reed, G. B. Roorbach, J. Russell Smith, P. S. Smith. The sessions for the reading of papers, which were open also to other persons interested besides members of the two organizations, were attended by from eighty to one hundred and twenty persons.

THE GEOGRAPHICAL WORK OF DR. E. W. HILGARD

Eugene Woldemar Hilgard, Ph.D., LL.D., who was born in Zweibrücken, Germany, on January 5, 1833, and whose death in Berkeley, California, on January 8, 1916, was noticed in the March *Review*, although not usually classed as a geographer, was one of the most noteworthy pioneers in geographical science in America. He was a splendid example of a type of broad-minded men versed in several sciences, common in the nineteenth century but becoming scarce in these days of increasing specialization. He was best known as a soil investigator, but he was also a chemist, geologist, and agronomist, and he had probably a better working knowledge of botany than any one else who has specialized in soils.

Dr. Hilgard spent most of his boyhood in Illinois, attended college in Switzerland and Germany, and did geological work in Spain. After returning to the United States he spent about two years in Washington, D. C., sixteen in Mississippi (most of that time as state geologist), two in Michigan, and nearly half his life in California. In the intervals of other work he also conducted geographical reconnaissances in Louisiana in 1867 and 1869 and in Montana and Washington in 1881-1883. His last visit to the eastern states was in 1891; and in later years his infirmities did not permit him to wander far from his home.

His first contribution to geography was his 415-page "Report on the Geology and Agriculture of the State of Mississippi," printed in 1860 (but not generally distributed until several years later, on account of the Civil War).[1] In that the state was divided into eight geographical divisions, and the geology, soils, vegetation, and agricultural features of each (except the Yazoo Delta) described in an interesting manner, and so accurately that one can find little fault with it even at this day.

The same principles were further elaborated in the reports on cotton production (modestly so called) of the southeastern states and California, in the fifth and sixth volumes of the Tenth Census, published in 1884.[2] Doctor Hilgard planned and directed the whole work and contributed about sixty pages of introductory matter, three pages on the "General features of the alluvial plain of the Mississippi below the mouth of the Ohio," the reports on Mississippi, Louisiana, and California, and a general agricultural map of the southeastern states which was a remarkable piece of work for that time.[3] The other states were assigned by him to the best geographers of each state (most of them state geologists). Agricultural (or rather geographical) maps of each state were printed in colors, and some of these have not been improved upon by any one else in three subsequent decades. The text, although ostensibly dealing primarily with cotton production, covers in considerable detail, for almost every region, such matters as geology, soils, topography, climate, vegetation, crops, proportion of improved land, density of population, ratio of white and negro population, yield of cotton per acre, transportation facilities, etc., with many interesting correlations to delight the geographer.

These cotton production reports, although fairly well known to geologists (probably because five of the six authors were or had been prominently connected with state geological surveys), have apparently been overlooked by most geographers, for several reasons. In the first place, there were few real geographers in this country at the time

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[1] See *Amer. Journ. Sci.*, Vol. 82, 1861, pp. 151 and 303; *Tenth Census of the United States*, Vol. 5, 1884, pp. 67 and 201; *Amer. Geologist*, Vol. 27, 1901, pp. 304-305; and *U. S. Geol. Surv. Bull. 283*, pp. 5-6, 1906.

[2] The one on Louisiana was first issued as a special census bulletin in 1881, as a model for the rest. See *Amer. Journ. Sci.*, Vol. 122, 1881, pp. 245-246.

[3] See *Bull. Torrey Botanical Club*, Vol. 37, 1910, p. 418.

they were published, and very few have ever lived in the southeastern states at any subsequent time. Then, one does not ordinarily look in census reports for scientific contributions, and the volumes of the Tenth Census were very cheaply and unattractively bound and the gilt lettering on their backs became almost illegible in a comparatively short time, so that one would easily pass them in a library without noticing them. Finally, the large quarto size of these volumes made them too inconvenient for reference purposes, an opinion expressed more than once by Doctor Hilgard himself.[4]

Hilgard's text-book on soils[5] embodies the results of the researches of a long and active life and contains much interesting geographical matter.[5] A list of some of his shorter geographical papers is given below.

Like most of his broad-minded contemporaries, Doctor Hilgard always wrote in plain, simple language, as free as possible from technicalities (other than names of geological formations, fossils, chemical compounds, etc.),[6] and with faultless grammar. As befits a truly great scientist, he was extremely modest, sincere, and unaffected.

Appreciative notices of Doctor Hilgard's work were published during his lifetime in the Report of the U. S. National Museum for 1904,[7] the *U. S. Experiment Station Record*,[8] and the *Bulletin of the Geological Society of America*.[9] There is a brief sketch of his life in the first number of *Soil Science* (New Brunswick, N. J., 1916), and two longer articles about him in *Science* for March 31, 1916. A more complete biography, with bibliography, will doubtless be published in the near future by some of his geological colleagues. His publications extend over a period of more than sixty years and comprise more than two hundred titles. Besides the books already mentioned, the following pamphlets and serial articles are of interest to geographers, though the titles do not indicate the fact very plainly in every case. The arrangement is chronological.

On the Quaternary Formations of the State of Mississippi. *Amer. Journ. Sci.*, Vol. 91, 1866, pp. 311-325.

On the Geological History of the Gulf of Mexico. *Amer. Journ. Sci.*, Vol. 102, 1871, pp. 391-404.

Supplementary and Final Report of a Geological Reconnoissance of the State of Louisiana, Made under the Auspices of the New Orleans Academy of Sciences and of the Bureau of Immigration of the State of Louisiana, in May and June, 1869. Pamphlet, 44 pp. New Orleans, 1873.

The Later Tertiary of the Gulf of Mexico. *Amer. Journ. Sci.*, Vol. 122, 1881, pp. 58-65, with map.

(With T. C. Jones and R. W. Furnas.) Climate and Agricultural Features and the Agricultural Practice and Needs of the Arid Regions of the Pacific Slope, with Notes on Arizona and New Mexico. 182 pp. Unnumbered report [subsequently designated No. 20], U. S. Department of Agriculture, Washington, 1882. [Not seen; abstract in *Amer. Journ. Sci.*, Vol. 125, 1883, p. 240.]

Soils of the Yakima and Colville Regions [Washington]. *Northern Transcontinental Survey, Agric. Dept., Map Bull. No. 1.* 1 p. of text, 3 maps (folio). New York, 1883.

Agriculture and Late Quaternary Geology [in the upper San Joaquin valley, California]. *Science*, Vol. 11, 1888, May 18, pp. 241-242.

The Lakes of the San Joaquin Valley. 4 pp. *California Exper. Sta. Bull. 82.* 1889.

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[4] See E. A. Smith, *Bull. Geol. Soc. Amer.*, Vol. 25, 1914, pp. 176-177.

[5] Soils: Their Formation, Properties, Composition, and Relation to Climate and Plant Growth in the Humid and Arid Regions. xxvii and 593 pp. The Macmillan Co., New York, 1907. See reviews in *Science*, Nov. 30, 1906, and *Torreya*, August, 1907.

[6] See his remarks on this point on pages vii and 207 of his "Report on the Geology and Agriculture of Mississippi," 1860.

[7] pp. 441, 483, 484, 561, 535, 700.

[8] Vol. 21, July, 1909, pp. 1-4.

[9] Vol. 25, 1914, pp. 170-173 and 176-177.

A Report on the Relations of Soil to Climate. 59 pp. *U. S. Weather Bureau Bull.* 1892. Reviewed in *Exper. Sta. Rec.*, Vol. 4, 1892, Oct., pp. 276-282. Partly reprinted, with revisions, in *California Exper. Sta. Rept. for 1893-4*, pp. 100-139.

The Cienagas of Southern California. *Bull. Geol. Soc. Amer.*, Vol. 3, 1892, pp. 124-127; also in *California Exper. Sta. Rept. for 1893-4*, pp. 185-188.

Steppes, Deserts, and Alkali Lands. *Pop. Sci. Monthly*, Vol. 48, 1896, March, pp. 602-616, with a few diagrams and figures.

Origin, Value and Reclamation of Alkali Lands. *U. S. Dept. Agric. Yearbook for 1895*, pp. 103-122, Figs. 3-7, Pl. 2. 1896.

Nature, Value and Utilization of Alkali Lands. 46 pp., 15 figs. *California Exper. Sta. Bull. 128.* 1900.

Why Ancient Civilizations Flourished in Arid Regions. *North American Rev.*, Vol. 175, 1902, pp. 309-315.

The Prairie Mounds of Louisiana. *Science*, N. S., Vol. 21, 1905, Apr. 7, pp. 551-552.

The Exceptional Nature and Genesis of the Mississippi Delta. *Science*, N. S., Vol. 24, 1906, Dec. 28, pp. 861-866.

A New Development in the Mississippi Delta. *Pop. Sci. Monthly*, Vol. 80, 1912, March, pp. 236-245.

ROLAND M. HARPER.

GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

New Fellows of the Society; Meetings of March and April. A regular monthly meeting of the Society was held at the Engineering Societies' Building, No. 29 West Thirty-ninth Street, on Tuesday evening, March 21. President Greenough presented by name the following persons, recommended by the Council for election as Fellows, and after a vote they were declared elected:

Donald S. Birkett — Albert H. Chamberlain
Leslie E. Coffin

Mr. B. R. Baumgardt, a member of the Southern California Academy of Sciences, then addressed the Society on "Sweden."

An extra inter-monthly meeting was held on March 14 at which Leo Wiener, Professor of Slavic Languages and Literatures at Harvard University, spoke on "Russia."

At a regular monthly meeting of the Society held on Tuesday evening, April 25, the following persons were duly elected Fellows of the Society:

Henry M. Ami
Mrs. Ralph Boyce
Frank G. Carpenter
Percy D. Dwight
Raymond B. Earle
Frank Roy Fraprie
John W. Frothingham
George M. Garland
Roy Garland
Lindley M. Garrison
Philip W. Henry
William Sargent Ladd
Lionel Sutro

Mrs. Harriet Chalmers Adams then addressed the Society on "The Philippines and the Sulu Sea."

At an extra inter-monthly meeting on April 11 Prof. J. Paul Goode, of the department of geography of the University of Chicago, spoke on "The Geographic and Economic Influences in the Great War." Professor Goode explained the geographic causes underlying the present war and, in the form of lantern slides, illustrated his address by means of a large number of ethnographic and other maps and graphs summarizing economic statistics.

NORTH AMERICA

The Oasis of Tuba, Arizona. South and east of the Colorado stretches the Painted Desert, wind-swept, desolate, beautiful in its fantasies of bare rock, color, and wind-carved form. In its vast expanse is only one spot where a reliable supply of drinking water may be found and where a corn crop is assured. This spot is the Tuba oasis ("The Oasis of Tuba, Arizona," by H. E. Gregory, *Annals Assoc. Amer. Geogrs.*, Vol. 5, 1915, pp. 107-119). For centuries Tuba has been a meeting point of routes, a goal and wayside station for many peoples. Its first known inhabitants were the Kisani, ancestors of the modern Hopi, who probably occupied it as an outpost from the Tusayan pueblos. Following the usual custom of the desert these agriculturists were driven out by the nomad hunting tribes from the north, Piute and Navajo. In the mid-seventeenth century the first Spanish explorers arrived. They found the oasis in a state of intermittent cultivation by Hopi farmers creeping cautiously from the nearest pueblo, Oraibi. Long afterwards pioneer bands of Mormons passed through on the route from Salt Lake City. In 1878 they made a permanent settlement, though at the time of foundation the Santa Fé railroad had not been built and all supplies had to be brought over weary trails, 450 miles from Salt Lake City or 370 miles from Albuquerque. Drought and Navajo attacks prevented the little colony from becoming prosperous. Since 1903 Tuba, purchased for the Indian Affairs Office, has become the seat of a government agency and a safe harbor for the old age of the Hopi race. In 1914 over two hundred of the fast-declining tribe have taken up permanent residence at the oasis, and the number is greatly increased during the summer.

In Tuba geographic relationships find one of their simplest expressions. Climate is fate. Its control over vegetation and thus over man is absolute. Hopi civilization was essentially based on Hopi corn (see "The Navajo Country: Part II, The People,"

by H. E. Gregory, *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, pp. 652-672). Of the 150 species of plants indigenous to the region, 144 have been put to practical use by this people, and all are known by name. The climate, characterized by its intense local variations, both in temperature and rainfall, is primarily dependent on elevation and exposure. The average precipitation for the period of continuous measurement from 1909 to 1913 is 7 inches, but this is a wet period compared with "the great drought" of 1900 and 1901. Most of the precipitation falls in the winter months. July, following the three driest months, is the crucial month. Corn grown without irrigation can only mature with a July rainfall more generous than the average. But Tuba has means of irrigation. Surface erosion and vertical cutting in the Moenkopi canyon walls have brought springs and water-bearing layers within reach. The water supply of the Moenkopi has actually been notably increased within recent years. The entrenched stream has cut through its alluvial floor to bedrock and augmented its flow by 600 to 800 per cent from 1878 to 1903. On the other hand a minor loss has been sustained through the burial of springs by shifting dunes. On the irrigated school lands of Tuba itself, about 40 acres, and on those of the Moenkopi canyon floor, about 1,000 acres, the Hopis raise surprisingly good crops of corn, wheat, alfalfa, vegetables, and fruit. With the agricultural produce and flocks they are self-supporting and content.

A Remarkable Fall of Hail in Maryland. Exaggerated reports of the sizes of hailstones are frequently met with, and careful investigation of such reports should, whenever possible, be made immediately after the storm and in the locality where the storm occurred. What was clearly an unusual fall of hail occurred in Maryland on June 22, 1915, and has been critically studied by Prof. Oliver L. Fassig, of the U. S. Weather Bureau (*Monthly Weather Rev.*, 1915, pp. 446-448). Fortunately, the largest hailstones fell in and about Annapolis, where many measurements of the stones were made. Ten or twelve stones, accurately measured by two officials of the U. S. Naval Academy, gave an average diameter of 3½ x 3 inches, with a maximum major diameter of 3 15/16 inches. These and other measurements show that the largest hailstones had a circumference ranging from 10 to 12 inches. Obviously, the popular reports of hailstones of "the size of a baseball or an orange" were not greatly exaggerated (a "league baseball" measures 9 inches in circumference). Many of the larger hailstones weighed about as much as a baseball (5 ounces). In some of the larger stones, from twenty to twenty-five concentric layers of opaque and transparent ice were counted. There were only two reports of personal injuries, both of them very slight. Skylights of glass 5/16 inch thick, with embedded wire netting, were broken.

In his "Lehrbuch der Meteorologie," von Hann cites occurrences of hailstones measuring from 4 to 6 inches in diameter and weighing over a pound. In India, Eliot found that 22 per cent of 600 hailstones measured were larger than a lemon. Another investigator, Buist, found the mean maximum circumference of Indian hailstones to be from 4 to 6 inches; the largest were 10 to 13 inches in circumference, and weighed from slightly over half a pound to one pound and a quarter. R. DEC. WARD.

The Subdivision of the United States into Physiographic Provinces. The inception of the important undertaking of providing a standard subdivision of the United States into physiographic provinces which has just been achieved with such marked success is related by F. E. Matthes in the latest issue of the *Annals of the Association of American Geographers* (Vol. 5, 1915, pp. 127-129). The presentation of various related papers at the Princeton (1913) and subsequent meetings of the Association showed that the matter was ripening to expression. Accordingly, at the Chicago meeting (1914) a "round table" conference was held at which Professor Nevin M. Fenneman of the University of Cincinnati, who had presented an important paper on "Physiographic Boundaries within the United States" the year before, presided. The first part of the discussion served to clarify ideas as to the scope of the work contemplated. While the importance of the "natural region" in systematic regional geography was recognized, it was felt that its composite nature—based, as it is, on a combination mainly of the three elements of relief, climate, and vegetation—makes it rather a matter for the individual investigator to determine, according to the purposes of his inquiry. A physiographic province, on the other hand, is a unit of a single kind, susceptible of more or less precise delimitation. The conference accordingly decided that the physiographic province, i. e. an area that throughout its extent has had essentially the same geomorphologic development, was the unit to be used in the subdivision of the United States. After discussing a number of topics such as the size and rank of provinces and their subdivisions, the character of the boundaries and the best mode of representing them on a map, the conference proceeded to a partition of the North American continent into its primary divisions. None of the questions at issue was definitely settled, nor was it the

object of the conference to undertake to settle them; but the nature and spirit of the discussions and the general feeling of harmony that prevailed guaranteed the success of the plan. The conference accordingly ended by passing a resolution recommending to the Council of the Association the appointment of a committee to undertake the preparation of a map of the physiographic provinces of the United States.

The committee appointed consisted of the following members: Nevin M. Fenneman, chairman; Eliot Blackwelder; Marius R. Campbell; Douglas W. Johnson; and François E. Matthes. At the Washington meeting of the Association in December, 1915, it was reported (see February *Review*, p. 136) that final agreement as to a working basis had been reached and that several provinces had been outlined. Quickly following upon this announcement came the display, at the recent joint meeting of our Society and the Association, on April 14 and 15, of the completed map. Two maps, strictly speaking, were exhibited, one showing the eight major physiographic divisions of the country and their constituent twenty-two provinces, and the other, the twenty-two provinces and their eighty subdivisions, called sections. The number of the latter is an indication of the magnitude of the task which the committee faced, and that it should have solved the problem so successfully reflects great credit upon its members and its indefatigable chairman, Professor Fenneman, whose previous extensive researches greatly facilitated the prompt completion of the undertaking. The map, which will at once be accepted as the standard representation of its kind, will shortly be published and made generally accessible, possibly through the U. S. Geological Survey.

Resumption of Traffic in the Panama Canal. The Panama Canal was reopened to traffic on April 15 with the passage of sixteen ships, seven bound for the Atlantic, and nine, including an army transport, for the Pacific. The waterway was blocked by slides in September (see January *Review*, p. 53) and has virtually been closed to traffic since. During this time the dredging fleet has removed a vast quantity of débris from the Gaillard Cut (formerly called the Culebra Cut) and has made the channel through the cut better than it ever was. It now has a width of 300 feet for a distance of a quarter of a mile and a maximum depth of approximately 35 feet.

Expert opinion as to the recurrence of slides and their prevention has just become available in the preliminary report of the committee appointed by the National Academy of Sciences at the request of President Wilson, a summary of which was published in the daily press of March 17. The preliminary report was prepared by Charles R. Van Hise, President of the University of Wisconsin, chairman; General H. L. Abbott, Corps of Engineers, U. S. Army; John C. Branner, professor of geology, Stanford University; Whitman Cross, geologist, U. S. Geological Survey; R. C. Carpenter, professor of mechanical engineering, Cornell University; Arthur P. Davis, chief of the Reclamation Service, Washington; John R. Freeman, consulting engineer, Providence; J. F. Hayford, dean of the College of Engineering, Northwestern University; and Harry Fielding Reid, professor of dynamic geology and geography, Johns Hopkins University.

"The committee looks to the future of the canal with confidence," the report declares. "It is not unmindful of the labor necessary to deal with the present slides, and it realizes that slides may be a considerable, but not an unreasonably large, maintenance charge upon the canal for a number of years: it also realizes that trouble in the Culebra district may possibly again close the canal. Nevertheless, the committee firmly believes that, after the present difficulties have been overcome, navigation through the canal is not likely again to be seriously interrupted. There is absolutely no justification for the statement that traffic will be repeatedly interrupted during long periods for years to come. The canal will serve the great purpose for which it was constructed, and the realization of that purpose in the near future is assured.

"The committee believes that some sliding ground will continue to enter the canal for several years to come, though in diminishing amounts. Any relatively inexpensive measures which tend to arrest the present active slides or which promise to reduce the charge against maintenance of the canal in the future are therefore fully warranted."

The committee believes that every available and practicable device should be used to divert precipitation from the area susceptible to slides. It suggests the following measures: (1) covering slopes with vegetation; (2) filling up the peripheral cracks that appear as warning signs, so that they will not intercept surface water; (3) drainage, both surface and tile, of undisturbed and threatened areas near the slides to prevent them from becoming unstable; (4) drainage of the slides themselves by a complete system of open drains which could carry the water away as directly as possible; (5) drainage by means of tunnels in a few special cases; (6) making a cut by sluicing in the East Culebra slide, starting at an appropriate point on the canal and diverging from it diagonally in a general southeasterly direction, in the zone of gentle slopes and in such a position as to reach the large pond which now exists on the slide.

A Military Map of Northern Mexico. A timely map of northern Mexico has just been received by the Society from the Pan American Union, Washington, D. C. It is entitled "Map of Sonora, Chihuahua, and Coahuila, Mexico" and is on a scale of 1:100,000, or about 16 miles to the inch. It was prepared by the War College Division of the General Staff in December, 1913, and was reproduced for the Pan American Union in 1914. It comprises all of Mexico—except the Gulf coastal plain—north of 26° N., i. e. the latitude of the city of Durango, together with southern Arizona and New Mexico and western Texas. The map is on the same scale as the official topographic map of Mexico published by the Comisión Geográfico-Exploradora, of which, however, only a small number of sheets have been published for this region (see the index map in the *Bull. Amer. Geogr. Soc.*, Vol. 46, 1914, opp. p. 434), so that the War College Division map constitutes the most detailed existing representation of the area. Lines of communication are very fully shown, as is natural in a military map. The great number of roads seems at first surprising for a region reputed so pathless as the Chihuahua desert, but it should be remembered that many of those represented—even the best of the three grades indicated—are but mere tracks. Indeed, closer examination shows that the road mesh in Chihuahua and Sonora averages forty or fifty miles across, as against about twenty in Sonora and five to ten miles in western Texas. The map is well suited to following the movements of the punitive expedition against Villa, all the places that have so far figured in the press despatches, Columbus, Hachita, Colonia Dublan, Casas Grandes, Babicora, Namiquipa, Guerrero, and Parral being indicated, together with much detail concerning mining centers, mountains, and railroads.

Studies of Central American Lakes. Four lakes situated on the Pacific slope of Central America, Amatitlan and Atitlan in Guatemala and Ilopango and Coatepeque in Salvador, were visited in February, 1910, by Chancy Juday. The account of his limnological observations is published in the *Transactions of the Wisconsin Academy of Sciences, Arts, and Letters* (Vol. 18, Part I, Oct., 1915, pp. 214-250). All lie near the middle of the north-tropical zone in a region which has a dry winter season from November to April and a wet season for the remainder of the year. They belong to the tropical class whose waters are disturbed throughout their entire depth but once a year. The purpose of the investigations was to obtain data on dissolved gases and net plankton content. Considerable interest was added to these researches by the situation of the lakes in volcanic regions.

It was found that no permanent stratification existed which would produce bottom stagnation of the water. The process of overturning and circulation takes place between the middle of November and the middle of December. As cool weather sets in the temperature of the upper layer of the water falls and convection currents are formed. The wind also produces circulation disturbances. This mixing of the water in winter produces a fairly uniform distribution of the dissolved gases and other substances held in solution. Water from the lower layers attains the surface and renews its supply of oxygen.

The plankton collected shows abundance and compares favorably in quantity with that of lakes in temperate latitudes. The greatest variety of forms was found in Lake Amatitlan, the shallowest of the four.

SOUTH AMERICA

Floods in the Argentine Territories. The progress of southern Argentina may be said to be punctuated by the meteorological extremes, flood and drought, to which the semi-arid region is subjected. Indians living on the banks of the Rio Negro described extraordinary floods in the years 1845-47. In 1879 a section of General Roca's expeditionary force against the Pampas Indians was imperiled by flood near the fort that bears his name, and lower down the valley early settlers suffered much loss. A single *hacendado* is said to have lost 20,000 sheep. Twenty years later Trelew in the Chubut was swept away, and the Welsh colonists deprived of practically all they had gained by previous good harvests. Since the last date the Argentine government has been engaged upon measures for the control of flood waters. In 1910 work was commenced on the Neuquen barrage, the great project that is to accomplish not only the aforesaid purpose but by irrigation is also to open up to settlement the Rio Negro valley, one of the most fertile areas of the republic. However, in a recent issue of the *South American Journal* (Dec. 18, 1915) it is stated that the flood-resisting strength of the nearly completed dam has been called in question; a question not improbably suggested by a recent catastrophe in the Colorado valley, north of and hydrographically similar to the Rio Negro. The unprecedentedly heavy rains of a year ago broke down the natural dam that in a late geologic period had formed the Andean lake of Carrilauquen, a source of the Colorado. The released waters, amounting to 2,800,000,000 tons, precipitated themselves into the lower

valley and 350 miles away flooded the Neuquen railroad line to such a degree that traffic was suspended for more than a month and heavy expenses incurred on account of damage to stock and property. The incident is briefly described in the *South American Journal* of October 16, 1915, and the *Geological Magazine* of December, 1915.

The Production of Cinchona: A Lost Industry of South America. The history of South America's commerce in the "divine medicine" shows even more than the usual exigencies of tropical production. Introduced to Europe by the Countess of Chinchon in 1640, the bark owed its first exploitation to those indefatigable pioneers of South American industry, the Jesuits. Early production was confined to the forests of Loxa whence exportation proceeded through the port of Payta. Reckless destruction of the trees of the Ecuadorian *montaña*—Humboldt reported that 25,000 were destroyed in a single year—led to search elsewhere in the Spanish domain (Quinine: A South American Gift to Humanity, by Edward Albes, *Bull. Pan Amer. Union*, Jan., 1916). Recovery from the period of depression incident on the Wars of Independence led to a remarkable development in the Peruvian montaña. In the mid-nineteenth century cinchona held the prominent place now occupied by rubber. Tribes of the lower *montaña*, from whom the *cascarilleros* were recruited, as are the *caucheros* of today, are said to date their chronology from the days of the "Great Quina." The government establishment of cinchona as a monopoly, with attempt to rule the prices on the European market, led to crises, failures, and endless legislation but stimulated production. High prices immediately caused a search for new forests. Such were found and stripped in the Bolivian *yungas*. In the first year after the creation of the monopoly the bark arriving in La Paz was nearly three times the amount legally available for export—7,000 quintals, an amount likewise exceeded by contraband export from the ports of Arica and Islay (Weddell: Bolivie et Peróu, Paris 1853; Favre-Clavairoz: La Bolivie, *Revue Contemporaine*, Paris, 1857). The introduction of the cinchona species into Java by the Dutch and into India and Ceylon by the British Government through Sir Clements Markham was the death blow to the South American industry. In 1882 Peru and Bolivia still exported as much as 8,900,000 pounds, about half the world's supply, but from that date the decline became rapid, and the present exportation is a negligible feature of their commerce. The wild forest product of a region almost devoid of means of communication and ill supplied with labor could not compete against carefully cultivated and accessible plantations in lands of abundant labor. But the present war is introducing new features into the world trade in quinine. The neutral nations are finding themselves practically cut off from the great markets of the East. Before the outbreak of the war the drug was sold at 20 cents per ounce; at the beginning of the current year the price had risen to $1.50, with prospects of going indefinitely higher. The situation calls attention back to the still undeveloped possibilities of the original home of the product. In recent years only spasmodic efforts have marked the industry in Peru and Bolivia. At Cuzco and La Paz a rather pretentious company was organized in 1911 for the exploitation of *cascarilla* in the Urubamba Valley in the little-known region of the "Great Bend" ("The Cañon of the Urubamba," by Isaiah Bowman, *Bull. Amer. Geogr. Soc.*, Vol. 44, 1912, pp. 881-897), but the lack of Indian (Machiganga) labor, the enormous difficulties of transportation, and the scarcity of plants brought disaster, and the field party turned to the rubber industry with quite as little success.

AFRICA

The Development of African Railways. Sir Charles Metcalfe, long connected with the work of Cecil Rhodes in South Africa as engineer of railway construction, has written a paper (Railway Development of Africa, Present and Future, *Geogr. Journ.*, Vol. 47, 1916, pp. 3-21, with map, 1:20,000,000) presenting many facts as to the origin and development of railway enterprises in Africa, beginning with 1857, when the first line, 54 miles long, was built between Cape Town and Wellington. Commercial, political, and military considerations have been the main factors in railway building. No routes were extended far into the interior of South Africa till diamonds were discovered at Kimberley and gold in the Witwatersrand district, where Johannesburg now stands. Cape Town and the rival seaports of Port Elizabeth, East London, and Durban competed for the Johannesburg trade, and all built lines that put them in touch with this gold mining center. Then President Kruger, of the Transvaal Republic, was influential in securing a rail route between the Portuguese port of Lourenço Marques on Delagoa Bay and Johannesburg; and Cape Colony supplied some of the money for it.

The track gage of three feet and six inches, still used in the Union of South Africa, is, in the opinion of Sir Charles, a great handicap to trade and development, for the distances are great and the narrow-gage speed is only half that on the standard-gage roads of Europe.

Among the many railway achievements which Sir Charles briefly describes are the lines from Daressalam, the capital of German East Africa, to Lake Tanganyika, 778 miles long, completed in February, 1914, at a cost of $35,000,000; the Shire River Railway, extended in 1914 from Blantyre in the British Nyasaland Protectorate to Chinde, the ocean port of the Zambezi River; the British East Africa Railway from Mombasa on the Indian Ocean to Victoria Nyanza, 582 miles; the branch extended from this line to Lake Magadi solely to tap its enormous soda resources; the great military line built by Kitchener in 1897 from Wadi Halfa through the desert across the bend of the Nile to Abu Hamed, extended to the Atbara in 1898, to Khartum in 1899, and later to Sennar on the Blue Nile and across the White Nile to El Obeid in Kordofan; and the line from the Atbara to Port Sudan, giving the Egyptian Sudan an all-rail outlet to the Red Sea. Turning to the Atlas region, Tunis has 1,144 and Algeria 2,298 miles of railway, chiefly coast lines with branches to or toward the desert; and when the war began, railways were making remarkable progress in Morocco towards Fez and Marrakesh.

Sir Charles says that, as a rule, it has been difficult to raise funds for railroad enterprises. River steamers have therefore been used as far as possible, railways working in conjunction with them. As trade increases, the railways will be made continuous, the rivers still being used as feeders. The railways that are being pushed steadily forward from the coast into the center of Africa will some day inevitably connect with the great trunk line passing north and south through the continent.

Cecil Rhodes, he says, never despised any great region, however uninviting it might appear, and his eyes were always fixed on the great territories north of Cape Colony. The railroad he conceived has now been built north as far as Bukama in the Katanga province of the Belgian Congo, 2,500 miles from Cape Town. A large part of it will form the southern section of the Cape-to-Cairo line (see note in the March *Review*, pp. 220-221), though Sir Charles does not use this name. In connection with this great enterprise, he speaks of the remarkable provision in the will of the late Alfred Beit, who bequeathed $10,000,000 in trust for financing railways in Rhodesia. He desired the money to be expended in the building of railways that are necessary but cannot possibly pay for some years. Capital will come to their support as soon as they are on a paying basis, and the bequest will then be used again for other railways. It is hoped that the money will be used in building a railway from the station of Broken Hill in Rhodesia to Tabora in German East Africa, then north to Sennar on the Blue Nile. There the last rail on the Cape-to-Cairo route will be laid. CYRUS C. ADAMS.

The Trade of Lourenço Marques in 1914. The trade of Lourenço Marques depends almost entirely upon the Transvaal, its natural commercial hinterland (*Diplomatic and Consular Repts.*, Ann. Series, No. 5558, London, 1916). Its activity comprehends three main phases—transit trade, in competition with Natal and the Cape; coaling trade; and trade as a recruiting center for the native labor employed on the Rand. Expenses and fees of the recruiting agency and gold brought into the country by the returned labor have contributed greatly to local prosperity. In 1913 the South African government decreed that no more labor should be imported from north of 22° S. latitude. As most of the Portuguese native labor comes from the province of Mozambique the blow has been severely felt. Endeavors are being made to substitute São Thomé as a field for contract labor under similar terms to those engaged in with the Transvaal. During the year 5,644 natives were dispatched to this destination. Other causes have contributed to produce the serious depression of the year—industrial disturbances in the Rand, prolonged drought, and, as a final crisis, the European war.

AUSTRALASIA AND OCEANIA

Weather Forecasts from Cirrus Cloud Directions in Australia. A somewhat unique publication comes from the highly progressive and efficient Australian Bureau of Meteorology. It is a study by E. T. Quayle of the relations between cirrus directions as observed in Melbourne and the approach of the various storm systems affecting Victoria (*Bulletin No. 10*, 1915). The object of the investigation is to increase the accuracy of the official forecasts and also to enable persons in the country "to gage with some degree of probability the amount of rain likely to result during the passage of depressions of the various types." While general relations between cirrus movements and storms have, of course, been investigated by numerous meteorologists (in the United States, by the Blue Hill Observatory staff, under the direction of the late Prof. A. Lawrence Rotch; and by Prof. F. H. Bigelow, formerly of the U. S. Weather Bureau), we have no publication of practical use for the everyday non-professional observer which

is nearly as complete as the present volume. Mr. Quayle points out that the relations between cirrus directions and storm systems is twofold: (1) cyclonic systems of air circulation usually extend their influence to the cirrus level; (2) the general drift of the air at that level has an influence in determining the development and translation of cyclonic or other storm systems. The relation of cirrus movements and the various storm types is considered in detail. A considerable series of simplified weather maps shows the cirrus directions at Melbourne and the rainfall distribution in connection with all the different types of storms.

Light is thrown on the genesis of many Australian cyclonic disturbances. These are often preceded by an extensive flow of air, at cirrus level, from the tropical belt. At first this air movement is non-cyclonic and on a very extensive scale. A wide stream of air begins to move polewards, bodily, accompanied by increasing cloudiness, which leads to thunderstorms and widespread rains. This phenomenon may continue without cyclonic development until latitudes 30°-35° S. are reached. Then the increasing differential effect of the earth's rotation becomes manifest in the formation of a cyclonic circulation around a central low. The dynamic energy of the whirl often results in the early formation of a high-pressure ridge across the barometric valley previously connecting it with the tropical low-pressure belt. From this time on, the rainfall is controlled by the cyclonic circulation. The cyclone then proceeds on its way eastward as an extra-tropical cyclone and finally merges in the great Antarctic low-pressure belt. The original latitudinal atmospheric movement results from the attempt to restore equilibrium, temporarily lost, between portions of the polar and equatorial belts. R. DEC. WARD.

A Proposed Expansion of the Pastoral Industry of South Australia. In 1914 the Geological Survey of South Australia organized an expedition to investigate the mining and pastoral prospects of the little-known region of the Musgrave and Everard Ranges (The Geology and Prospects of the Region to the South of the Musgrave Ranges, and the Geology of the Western Portion of the Great Australian Artesian Basin, *Geol. Survey of South Australia Bull. No. 5*, Adelaide, 1915). These ranges are residuals rising above peneplaned surfaces of ancient rock west of the "great artesian basin." Mineral prospecting is not easy, for much of the widespread level surfaces is cloaked with deep superficial deposits. Thus, while the mineral possibilities cannot be said to have been exhaustively examined, in so far as the reconnaissance went prospects are not encouraging. No trace of tin was encountered, and the evidences of gold and copper were scant in a region where, on account of transportation difficulties and restricted water supply, a deposit must be rich to have any economic worth.

Prospects for the pastoral industry are brighter. The vegetation is generally sufficient. The staple for stock is found in the good grasses of the valleys. Other areas offer supplementary resources that would prove invaluable during dry seasons. There are the coarse grasses of the sandy tracts, the rushes of the swampy depressions, the salt bush of the elevated stony plains, the hill porcupine grass, inedible in the main but affording a delicacy in its inflorescence. The industry is assured if sufficient water can be obtained. This factor depends entirely upon local meteorological conditions, for west of the Cretaceous artesian basin there is no assurance of underground water. Water is obtained from waterholes and shallow wells, the supply of which is known to vary greatly. Giles in the first exploration of 1873 reported Ferdinand Creek as a "perennial running stream." In 1895 its water was much reduced but still was sufficient to support 1,000 head of cattle. The 1914 expedition found no moisture even at the bottom of the sand of the stream bed. Other circumstances indicate the present as a period of exceptional drought. The Musgrave Range has been deserted by the natives, and everywhere the vegetation shows signs of exhaustion. On the other hand there exist evidences of recent floods and comparatively heavy rainfall. In one native camp a child of seven or eight years of age was pointed out as born in the year of a big and general flood. The region lies in the transitional zone between the belt of cyclonic storms and the monsoonal rains of the north. There is no rainfall record, but on the transcontinental telegraph line to the east the annual average (*Commonwealth Bur. of Meteorol. Annual Summary, 1910*) is about 5 inches. The summer monsoonal rain is the more important, and local residents say that 3 inches in the early summer is sufficient to maintain the industry satisfactorily for a year. In the two localities possessing wells sheep and cattle are thriving. Expansion of the industry must be preceded by the sinking of wells—as many as possible to conserve the neighboring pasture—in the restricted areas where the right surface conformation and rock structure for water catchment exist. Heretofore there has been no stimulus to expansion, but today the worldwide reduction in stock accentuated by the European war, the elimination of former competitors, and the improved facilities for shipment offer new incentive to the pastoral industry.

POLAR REGIONS

Return of the "Aurora" of the Shackleton Expedition. Press despatches report the arrival on April 3, at Dunedin, New Zealand, of the *Aurora*, the ship which was to establish a base on the shore of Ross Sea for the members of Sir Ernest Shackleton's expedition on their arrival from Weddell Sea on the opposite side of the Antarctic Continent. The *Aurora* left Hobart, Tasmania, at the end of 1914. On January 9, 1915, she arrived at Cape Crozier, the eastern tip of Ross Island. Finding conditions too bad to permit landing, the *Aurora* sailed west around the island to Cape Evans, off which she anchored. From the end of January to the middle of March various expeditions ashore were made for the purpose of landing stores, arranging the depot, testing the motors, and doing scientific work. On May 6 during a violent blizzard the *Aurora* broke away from her moorings. There were then ten men ashore, including Lieutenant Mackintosh, the leader of the Ross Sea party, H. E. Wild, Ernest Joyce, J. Cope, A. Stevens, A. Spencer Smith, and Victor Hayward. The ship, with the remainder of the crew, then became blocked in pack ice and for over ten months drifted helplessly, covering about 500 miles in a general northerly direction along the coast of Victoria Land. On July 21, 1915, the ice pressure severely strained the hull and carried the rudder away. The vessel was then about 90 miles south of Coulman Island, which lies off the coast of Victoria Land in 73½° S. and 170° E., and only got away from the ice on March 14 last, in 64° 30′ S. and 161° E., just north of the Balleny Islands. As soon as she was released, a steering gear was improvised and the course set for New Zealand, which was reached in three weeks, as stated above.

The forced departure of the *Aurora* leaves two parties in possible peril, the main transcontinental party under Shackleton and the shore party under Mackintosh. No news has been received from Sir Ernest since January, 1915, when he started south from South Georgia in the *Endurance* (*Bull. Amer. Geogr. Soc.*, Feb., 1915, p. 129). The ice then was so bad that he did not expect to cross the continent until the next Antarctic summer, beginning in October, 1915. If he succeeded, he will now be hoping to find supplies on descending from Beardmore Glacier, which Mackintosh's party will, however, hardly have been able to reach in their present isolation. If Shackleton is able to reach Cape Evans he will find there an abundance of food and fuel, but no clothing. This and the provisions landed from the *Aurora* also promise to maintain the Mackintosh party if they hold out through the approaching Antarctic winter until succor can reach them, in December, at the earliest.

PHYSICAL GEOGRAPHY

The Natural Region. In a paper entitled "Natural Economic Regions" (read at the Chicago meeting of the Association of American Geographers, 1914, and printed in the *Annals* of the association, Vol. 5, 1915, pp. 121-125), Prof. Charles R. Dryer calls attention to the prime need of the geographer of today—the establishment of the "natural region." Man's changing and varied relations to his environment render the problem complicated in the extreme. The best method of approach appears to be by the economic interpretation. Economic influence affords a basis for the estimation of the relative values of the different factors entering into the complex. The natural economic complex is based fundamentally upon vegetation, functioning in part through animal media, and upon climate, itself the primary phytogeographic control. In the determination of the major natural regions physiographic controls are of subordinate importance. They operate indirectly through their effect on the two principal factors and are to be considered rather as important, often dominant, determinants in the subdivision of the major region.

The Distribution and Origin of the Beech. From Bukowina to Buckinghamshire are conserved place-name records of the important part the beech has played in the progress of Western civilization. Its employment by man dates back to Neolithic times in the Swiss lake dwellings. In medieval days it nourished alike hearth and forge and the herds of swine that contributed so largely to man's subsistence. Today the tough, strong wood of the beech finds many uses in the making of wooden ware. For such purposes the North American species is in demand as well as the European. The beech ranges from eastern North America through Europe and the Nearer East; two species occur in eastern Asia, and the range of the family is further extended by the presence in the southern continent of *Nothofagus*, the Antarctic beech, a genus very closely related to the northern beech (*Fagus*). From Chiloe to Tierra del Fuego the rainy Pacific slopes are clothed with dense forest in which the Antarctic beech predominates. In this region of equable but low annual temperature the beech species is characteristically small-leaved and evergreen in habit. These forests are practically unexploited. Un-

fortunately where the timber might be of greatest service—in the district of Punta Arenas—it is smallest and otherwise unsuitable for the purposes of lumbering. Utilization of the forest must await further settlement. Similar forests exist in New Zealand, and *Nothofagus* is also known in southeastern Australia.

This wide distribution arouses interest in the question of the origin of the beech (Notes on the Ancestry of the Beech, by Edward W. Berry, *The Plant World*, Vol. 19, 1916, No. 3). The earliest recorded forms appear practically simultaneously in Europe and North America, the one in the Cenomanian of Saxony and the other in the Dakota Sandstone of the western United States, whence is argued their common origin in some third region, presumably Asiatic or Arctic. Present evidence favors the former. The beech has not been found in the Cretaceous of Greenland, though it appears in the Tertiary, and it apparently did not take part in the Cretaceous migratory wave that passed along the eastern coast of North America. Assuming an Asiatic origin, waves would spread westward to Europe and eastward through Alaska and southward to the southern continent, where it is known in the early Tertiary, through Antarctica—it occurs in Graham Land—to New Zealand and perhaps Australia, though Australia may have got its forms via southeastern Asia. The northern origin of the Antarctic form is strengthened by the discovery of *Nothofagus* in European Tertiary deposits, in the Oligocene of Greece.

HUMAN GEOGRAPHY

The Fate of Primitive Races. With few exceptions the contact of races differing widely in civilization has resulted in the decline of the inferior. Much of the explanation lies in the operation of "the law of struggle and work." Too often the higher civilization, simply destructive, has eliminated native habits of work without providing substitute forms. In primitive societies division of labor usually allots cultivation and the handicrafts to the women: men's work is war. The advent of the trader, missionary, settler, and the government intervening for their protection means that war must cease. The men are left with idle hands. In the eastern islands of Malaysia, for instance, although the shock of actual contact with the white intruder has been little experienced, the work-destroying cause has operated from a distance. The tribes are diminishing. The sago-palm offers too easy a livelihood for peoples deprived of their old-time exercise of war. There are, however, some notable examples of the success attending the introduction of suitable work. Not long ago it was predicted that the Maori would soon be extinct as his brother Tasman, but the development amongst the race of farming and sheep-shearing during the last twenty years has reversed the current of decline. All-saving labor has likewise arrested the sterility that threatened to obliterate the natives of the southern New Hebrides (Aboriginal Decay in the Pacific Ocean, by J. Macmillan Brown, *Journ. of Race Development*, Vol. 6, 1916, No. 3). In the southwest of the United States the unspoiled Navajo flourishes, a remarkable exception to the common fate of the North American Indian (see "The Navajo Country," Pt. II, by H. E. Gregory, *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, No. 9, and "Record" item, "The Navajo Indian in Relation to the State" in the same number; also "The Era of Indian Demoralization," by Archer B. Hulbert, *Journ. of Race Development*, Vol. 6, 1916, No. 3). Stefansson has shown the destructive influences at work amongst the demoralized Eskimo, and analogous illustrations come from the southern extreme of the continent. In less than half a century the Yahgan Indians of the Ushuaia missions were reduced from several hundreds to a bare handful. The Pampas Indian has gone, and the Patagonian is following him. With their decay one may contrast the historic achievement of the Jesuit Fathers in the Paraguay missions, where, as a motto, work held equal place with obedience.

EDUCATIONAL GEOGRAPHY

Report on School Map Material. At the meeting of the British Association in Manchester last September the Committee on Atlas, Textual, and Wall Maps for School and University Use made a report which is printed in the *Scottish Geographical Magazine* for November (pp. 574-577). The substance of the report follows:

Where both orographical and political maps of one region are provided only names of physical features should appear on the orographical map. The color scheme adopted for the International Map in 1:1,000,000 should be followed as closely as possible for all physical maps. For the sea deepening shades of blue should be used, with depths in feet; for lakes the same blue as for the shallowest sea; also blue for rivers and river names, and red lines for political frontiers on an orographical map. Colors indicating relief should not be interrupted at the frontier but carried to the margin of the map.

Few varieties of projection should be used in a school atlas. For hemispheres, Clark's

minimum error projection is best; the globular projection is to be avoided. For continents and larger countries, the zenithal equal-area projection should be used; for smaller countries, a simple conical development. Mercator's projection should be excluded from the body of a school atlas, though it may effectively be employed as an index sheet. Hemisphere maps should be much more freely employed as they are the most accurate representation, except the globe, of the earth's surface. Where practicable, they should be used to exhibit world distributions of all kinds. The scales employed should be few and as a rule simple multiples one of another. On each map the scale should be plainly stated. In the margin should be indicated other towns in the same latitude and also (on maps of wide extent) the area of a quadrilateral of the network.

The few recognized conventional signs are sufficient, except to indicate any new feature such as a first-class wireless station or the employment of river water for power or irrigation. The limit of navigation may be shown by an anchor. The solid black dot for town sites is better than the fine open circle, as more clearly revealing concentration of urban population. Larger towns require a larger dot or a dot within a circle.

Words or conventional signs indicating the distribution of economic production are deprecated. If economic factors must be shown on a general map, solid color or shading should be used to indicate the concentration of industrial population or the locality of two or three commodities of first importance.

Black-and-white maps in school books (textual maps) should not supersede atlas maps but should be confined to illustrating statements in the text. A textual map must be simple and should not attempt to show large detail. Features tending to mutual obscuration should not be shown on the same map.

The recommendations of the Committee in regard to the style of a school atlas apply almost without modification to all wall maps. The scales, however, should be as few as possible and should be simple multiples of each other. The far larger scale of a wall map is no excuse for the introduction of minute detail or a crowd of names. A wall map is essentially a diagram. The use of wall maps without names or with only a few names or initials is greatly to be encouraged. Color both in atlas and wall maps shows relief better than contours. The wall map is intended to supplement but not to replace the atlas. Most wall maps fail by attempting too much.

GEOGRAPHICAL NEWS

Personal

Dr. Joseph Barrell, professor of structural geology in Yale University, delivered during March a series of lectures on the "Nature and Bearings of Isostasy" before the department of geology of Columbia University.

Sir S. G. Burrard, Surveyor-General of India, at the third Indian Science Congress which met at Lucknow on January 13-15 read a paper on "The Plains of Northern India and Their Relationship to the Himalaya Mountains."

Mr. George K. Cherrie, who accompanied Colonel Roosevelt as an ornithologist on his Brazilian expedition of 1914, gave a lecture at the American Museum of Natural History on March 17 and at Public School No. 19 of the Borough of the Bronx on April 4, entitled "With Colonel Roosevelt on the River of Doubt."

Prof. Frederick E. Clements, of the department of botany of the University of Minnesota, spoke on "The Story of the Forest" before the Forestry Club at the New York State College at Syracuse University on December 16.

Prof. Henry C. Cowles, of the department of botany of the University of Chicago, spoke on "The Vegetation of the United States as Influenced by Glacial Action" before the Forestry Club at the New York State College of Forestry at Syracuse University on March 2.

Dr. J. D. Falconer, lecturer in geography at the University of Glasgow, has been appointed temporary assistant district officer in the northern provinces of Nigeria.

Prof. B. E. Fernow, of the University of Toronto, spoke on "The Birth of a Forest Policy" before the Forestry Club at the New York State College of Forestry at Syracuse University on January 27.

Prof. George I. Finlay, of the department of geology of New York University, spoke on April 17 before the New York Academy of Sciences on "The Geology of North Park, Colorado."

Dr. A. A. Goldenweiser read a paper on March 27 before the New York Academy of Sciences entitled "Notes on the Social Organization of Melanesia."

PROF. A. W. GRABAU, of Columbia University, spoke on April 17 before the New York Academy of Sciences on the "Geology of the Island of Gotland in the Baltic Sea."

PROF. LYMAN B. HALL, professor of English and American history at Oberlin College, will give a course on the "Physical, Political, Commercial, and Historical Geography of England" at the coming summer session of the college.

MR. FRANCIS HARPER, lately of the Brooklyn Institute Museum, has been appointed to make a detailed study of the fisheries of Oneida County, New York, as a basis for scientific working plans for fish stocking and protection.

MR. EDMUND HELLER, naturalist, has joined the zoölogical expedition to southern China conducted by Mr. Roy C. Andrews under the auspices of the American Museum of Natural History (see the April *Review*, p. 308). Mr. Heller will be remembered as a joint author with Colonel Roosevelt of a valuable contribution to the zoögeography of Africa entitled "Life Histories of African Game Animals" which was reviewed in the March, 1915, *Bulletin of the American Geographical Society* (pp. 190-192).

PROF. WILLIAM H. HOBBS, of the University of Michigan, has been elected President of the Michigan Academy of Sciences for the current term of office.

PROF. GEORGE D. HUBBARD, of the department of geology of Oberlin College, will give a course on field geology during the coming summer session. The region selected is in southern Vermont near the Deerfield River.

PROF. DOUGLAS W. JOHNSON, of Columbia University, on April 11 before the teachers of Dayton, Ohio, repeated his lecture on "The Influence of Topography on the European War."

DR. WILLIS T. LEE, of the U. S. Geological Survey, gave an illustrated lecture on April 7 at Lehigh University on "Camp Life of a Geologist in the Rocky Mountains."

PROF. LAWRENCE MARTIN, of the University of Wisconsin, on April 19 gave the Heilprin Memorial Lecture before the Geographical Society of Philadelphia. His subject was "The Gorge of the Upper Mississippi as a Rival of the Rhine Gorge."

MISS MAJORIE O'CONNELL read a paper on April 17 before the New York Academy of Sciences entitled "Notes on the Geology of Oesel in the Gulf of Riga."

MR. WILFRED H. OSGOOD, of the American Museum of Natural History, spoke on April 28 before the Geographic Society of Chicago on "The Fur Seals and Other Animals of the Pribilof Islands."

PROF. GEORGE B. ROORBACH, of the University of Pennsylvania, lectured on April 5 before the Geographical Society of Philadelphia on "Venezuela, Our Nearest South American Neighbor."

GENERAL JULES M. DE SCHOKALSKY, who, it will be remembered, was a member of the Society's Transcontinental Excursion in 1912, has been elected an honorary member of the Italian Royal Geographical Society.

PROF. ROLLIN D. SALISBURY, of the University of Chicago, lectured on April 14 before the Geographic Society of Chicago on "Porto Rico."

MR. J. WARREN SMITH, head of the Columbus (Ohio) station of the U. S. Weather Bureau for eighteen years and professor of meteorology at the Ohio State University, has been promoted to be Chief of the Division of Agricultural Meteorology, with headquarters in Washington.

MR. DAVID T. THOMPSON, instructor in geology in Goucher College, will give a course on "Physical and Economic Geography" during the coming summer session at Johns Hopkins University. The course will deal with the general principles of the subject and with their application to the European War and to the United States.

DR. O. H. TITTMAN, president of the National Geographic Society and formerly superintendent of the U. S. Coast and Geodetic Survey, has been elected a vice-president of the Washington Academy of Sciences for the year 1916.

DR. CHARLES R. VAN HISE, President of the University of Wisconsin, lectured on March 17 under the auspices of the Sigma Xi Society at the University of Minnesota on "The Panama Canal, with Especial Reference to the Slides." President Van Hise is chairman of the commission appointed at the request of President Wilson by the National Academy of Arts and Sciences to investigate the slides, and returned some time ago from a trip to Panama (see also, above, the note on the "Resumption of Traffic in the Panama Canal").

GEOGRAPHICAL PUBLICATIONS

(Reviews and Titles of Books, Papers, and Maps)

For key to classification see "Explanatory Note" in the January number, pp. 57-61

NORTH AMERICA

ALASKA

MUIR, JOHN. **Travels in Alaska.** viii and 327 pp. Ills., index. Houghton Mifflin Co., Boston, 1915. $2.50. 8½ x 5½.

It is indeed fortunate that a permanent record is available of John Muir's Alaska explorations and studies, for the student has in the past been forced to rely on more or less fugitive articles relating to this important work. When Muir made his first journey into southeastern Alaska in 1879 its glaciers had never been studied, and the grandeur of the fiorded coast line was known to but few. It was his vivid account of the magnificent scenery and his sympathetic description of the mountains and glaciers that gave the first call to the mountaineer and naturalist to explore this new field. John Muir's discovery of Glacier Bay and its great ice fields is generally known; but less attention has been paid to his many other contributions to geographic knowledge, such as his exploration of minor bays and visits to glaciers. Aside from the value and interest of its scenic descriptions, the book is full of references to native customs, plants, and animals, as well as to glacial phenomena. It should be read by every nature lover and should be the companion of every Alaska traveler. ALFRED H. BROOKS.

ELLSWORTH, C. E., AND R. W. DAVENPORT. **A Water-Power Reconnaissance in South-Central Alaska.** With a section on Southeastern Alaska, by J. C. Hoyt. 173 pp. Maps, diagrs., ills., index. *U. S. Geol. Surv. Water-Supply Paper 372.* Washington, 1915. [The area investigated extends from the Bering River Basin to the eastern part of the Kenai Peninsula. It is favored with abundant small water-power resources and includes also a few sites where 1,000 to possibly 5,000 horsepower might be developed. Sources of possible competition lie in the valuable coal and oil fields of this and adjacent areas. The investigations are to be continued this summer (see note on the plans of the U. S. Geological Survey in the April *Review*, p. 306).]

GRAVES, H. S. **The Forests of Alaska.** Ills. *Amer. Forestry*, No. 265, Vol. 22, 1916, pp. 24-37. [Abstracted in the March *Review*, pp. 216-217.]

KEEN, DORA. **First Exploration of an Alaskan Glacier.** Ills. *Mazama*, Vol. 4, 1915, No. 4, pp. 38-39. Portland, Ore.

MOYE, M. **Le tremblement de terre de l'Alaska du 11 septembre 1899.** *Bull. Soc. Languedocienne de Géogr.*, Vol. 38, 1915, No. 3, pp. 194-203. Montpellier.

CANADA

Alberta, Saskatchewan, Manitoba

ADAMS, F. D., AND W. J. DICK. **Discovery of Phosphate of Lime in the Rocky Mountains.** 36 pp. Maps, diagrs., ills., index, bibliogr. Commission of Conservation, Ottawa, 1915.

Investigations recently carried out by the Commission of Conservation of Canada show a decreased yield in the older grain fields of the Canadian West. The decrease is in large measure due to depletion of the phosphate content of the soil. Sources of supply for a restoration of this content have been considered. The phosphate deposits of Canada known heretofore were limited to the apatite beds of the eastern provinces, with an output never great and altogether insignificant since 1892. In the world's supply of phosphate the United States holds the foremost position, Tunis follows, and other countries contribute comparatively small amounts. The importance of the United States as a producer of phosphate dates back, a short time only, to the discovery of the rich deposits of the western states—Utah, Idaho, Wyoming, and Montana. Throughout this area the phosphate occurs in a well-defined geologic horizon near the top of the Carboniferous. The Montana beds, located roughly two degrees south of the international boundary, suggest the possibility of the occurrence of similar beds in a similar horizon north of the line. The Conservation Commission decided to investigate. Three

sections across the Canadian Rockies were selected for reconnaissance, the North Kootenay and Crowsnest Passes, and the Rocky Mountain Park at Banff. In the two former sections Upper Carboniferous strata were proved absent, but in the Banff Park area phosphate, resembling the Montana product in many respects, was found in the same horizon. The discovery and its significance are detailed in the present report, which, in addition, gives suggestions to prospectors who may wish to follow up the discovery, and a bibliography of literature relative to Western phosphate deposits.

Geological map of Alberta, Saskatchewan, and Manitoba. 1:2,217,600. Geological Survey, Dept. of Mines, [Ottawa], 1913.

Map showing irrigation schemes in Alberta and Saskatchewan. 1:2,217,600. Irrigation Office, Dept. of the Interior, Ottawa, 1913.

Ontario, Quebec

JOHNSTON, W. A. **Rainy River District, Ontario: Surficial Geology and Soils.** xii and 123 pp. Maps, ills., index, bibliogr. *Geol. Surv. of Canada Memoir 82: Geol. Series No. 68.* Ottawa, 1915. [Abstracted in the February *Review*, p. 142.]

—— **Mineral Production in the Province of Quebec during 1915, Preliminary Statement on the.** 7 pp. Dept. of Colonization, Mines, and Fisheries, Quebec, 1916. [The heavy decrease in production of structural materials has not been compensated by the increase of metalliferous ores to a record figure.]

Geology [of] St. Hilaire and Rougemont Mountains, Rouville and St. Hyacinthe Countries, Quebec. 1:126,720. Accompanies, as Map 101A, "St. Hilaire (Beloeil) and Rougemont Mountains" by J. J. O'Neill, *Geol. Surv. of Canada Memoir No. 43.* Ottawa, 1914. [The text which this map illustrates was noticed in the Feb. *Review*, p. 151.]

Rainy Lake, Rainy River District, Ontario. 1:63,360. Map 98A, Geological Survey, Dept. of Mines, [Ottawa], 1914. [Also accompanies the report by W. A. Johnston listed above.]

Geology [of] Southwestern Ontario: Outline Map. 1:500,000. Accompanies, as Map 116A, "The Devonian of Southwestern Ontario" by C. R. Stauffer, *Geol. Surv. of Canada Memoir No. 34.* Ottawa, 1915.

UNITED STATES

North Atlantic States

—— **New York City, Development and Present Status of City Planning in: Being the Report of the Committee on the City Plan,** December 31, 1914, together with papers presented at a meeting of the Advisory Commission on City Plan, December 17, 1914. 76 pp. Maps, diagrs., ills. Board of Estimate and Apportionment [of the City of New York], New York, 1914. 10½ x 6½.

New York has an admirable institution in this Committee on the City Plan. Five borough presidents give it weight, and practical wisdom is provided by the Advisory Commission of twenty-four citizens. They do not expect to formulate a plan for years. For the present they are gathering solid information on the unknown facts that constitute a great city's daily life. Whatever plan they some day submit will be flexible and responsive to changing conditions. These papers serve to formulate the problems that await the Committee's action. Two items may here be dwelt upon: (1) A mistake that cannot be undone is the arrangement on Manhattan Island of numerous cross streets to carry traffic that engineer Randall expected in 1807 to flow from river to river across the infrequent avenues that run the long way of the island. Perhaps it could not have been made out in 1807, by any amount of study, that the main traffic must flow along the avenues. At any rate the blocks run the wrong way, and heavy streams of people and vehicles move along too infrequent avenues on lines interrupted thrice as often as need be by street openings, all because of a faulty conception of traffic needs. (2) On the other hand the Committee has to meet and overcome an enormous opposition of private interests that have no thought of yielding anything to the common good. Myrtle Avenue was laid out 100 feet wide from the Brooklyn Borough line to Jamaica. But the city delayed purchasing title to the required land. Buildings were put up across the proposed lines, and the property owners then forced the narrowing of the street to 70 feet. All plans for the improvement of an American city have to be carried out in full democracy.

It is to be hoped that the Committee's studies of growth of population and volume of traffic may find speedy publication. MARK JEFFERSON.

—— **Boston, Consular District of, Trade and Commerce of the, Report for the Year 1914 on the.** 64 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5542. London, 1915.

HICE, R. R. **The Mineral Production of Pennsylvania for the Year 1913.** 108 pp. *Topogr. and Geol. Surv. of Pennsylvania Rept. No. 11.* Harrisburg, 1915. [The mineral production of Pennsylvania—exclusive of derived products—amounted to $506,466,759 in 1913, an increase of 13.5 per cent on the record of 1912.]

—— **Jamaica Bay Improvement, First Unit of, Completed.** Map. *Engineering Rec.*, Vol. 73, 1916, No. 12, pp. 392-393. [Mill Basin, on the western, Brooklyn, shore of the bay. The Jamaica Bay improvement is to furnish additional facilities, especially for handling freight, to the port of New York.]

MCSWEENEY, E. F., JOSEPH A. CONRY, AND LOMBARD WILLIAMS. **The Use and Benefits to Massachusetts Manufacturers and Wage Earners of an American Merchant Marine.** 14 pp. Diagrs. *Directors of the Port of Boston Bull. No. 2.* Boston, 1915. [See note in the Feb. *Review*, p. 141.]

—— **Philadelphia, City Planning on an Exceptionally Large Scale . . . . at.** Maps, diagrs., ills. *Engineering Rec.*, Vol. 73, 1916, No. 11, pp. 344-348.

Rand, McNally Commercial Map of Greater New York: Sections A and B. 1:7,200. Rand, McNally & Co., New York, [1915]. [Two white-print maps, covering together Manhattan and the western Bronx, evidently based on the same compilation, although on a larger scale, as the same firm's excellent "New Standard Map of Greater New York," familiar to all travelers on the subway and elevated, which was reviewed at length in the *Bull. Amer. Geogr. Soc.*, Vol. 43, 1911, pp. 795-796. Although the copyright entry bears no date, the map is evidently very recent, as it shows the New York Connecting Railroad and the ferry from Dyckman Street to Englewood, N. J. The 207th Street crosstown surface line over the Harlem is, however, omitted between Broadway and Bailey Avenue.]

Cape Elizabeth to Portsmouth, Maine–New Hampshire. 1:80,000. Chart No. 1205, U. S. Coast & Geodetic Survey, Washington. Edit. of June, 1915. Price, 50 cents.

Portsmouth to Cape Ann, New Hampshire–Massachusetts. 1:80,000. Chart No. 1206, U. S. Coast & Geodetic Survey, Washington. Edit. of June, 1915. Price, 50 cents.

Cohasset Harbor, Massachusetts. 1:5,000. Chart No. 242, U. S. Coast & Geodetic Survey, Washington. Edit. of May, 1915. Price, 30 cents.

Sea Girt Light to Little Egg Inlet, New Jersey. 1:80,000. Inset: Little Egg Inlet, 1:40,000. Chart No. 1216, U. S. Coast & Geodetic Survey, Washington. Edit. of January, 1915. Price, 50 cents.

North-Central States

FLORA, S. D. **Tornadoes in Kansas.** *Monthly Weather Rev.*, Vol. 43, 1915, No. 12, pp. 615-617.

HERROLD, G. H. **Draining the Roseau River Swamp in Minnesota.** Map, diagrs., ills. *Engineering News*, Vol. 75, 1916, No. 8, pp. 366-368.

HERSEY, H. B. **Climatological Data (Annual, 1915): Wisconsin Section.** Maps. *Climatological Data* (Annual), Vol. 20, 1915, No. 13, pp. 99-108. Weather Bureau, Washington, D. C.

WEIDMAN, SAMUEL, AND A. R. SCHULTZ. **The Underground and Surface Water Supplies of Wisconsin.** xxii and 664 pp. Maps, diagrs., index. *Wisconsin Geol. Surv. Bull. No. 35.* Madison, 1915. [Accompanied by a geologic map of Wisconsin, 1:1,000,000, showing artesian conditions and the determinant elevations of the Precambrian.]

South-Central States

CLINE, I. M. **Temperature Conditions at New Orleans as Influenced by Subsurface Drainage.** *Monthly Weather Rev.*, Vol. 43, 1915, No. 12, p. 607. [Author's abstract of paper read at the Pan American Scientific Congress in Washington, Dec., 1915-Jan., 1916. "The frequent occurrence of high temperatures at New Orleans in recent years, which general meteorological conditions did not account for, indicated that some local influences are responsible."]

DEUSSEN, ALEXANDER, AND R. B. DOLF. **Ground Water in Lasalle and McMullen Counties, Texas.** Maps, index. *U. S. Geol. Surv. Water-Supply Paper 375-G*, pp. 141-181. Washington, 1916. [These districts are semi-arid. Agriculture can depend to a limited extent on irrigation from wells and impounded storm waters, but "most of the land if cultivated at all must be reclaimed by the intelligent application of dry-farming methods."]

ROOSEVELT, THEODORE. **The Bird Refuges of Louisiana.** Map, ills. *Scribner's Mag.*, Vol. 59, 1916, No. 3, pp. 261-280. [Thanks to vigorous action on the part of the State Conservation Commission, created only in 1912, the game and water fowl preserves of Louisiana extend for 75 miles along the Gulf Coast and cover an area of 500 square miles. Already there has been notable increase in the species frequenting the shores for breeding purposes. (See also note on "New Duck Species Breeding in Louisiana," *The Wilson Bull.*, No. 92, 1915.)]

SMITH, E. A. **Statistics of the Mineral Production of Alabama for 1914.** 64 pp. *Geol. Surv. of Alabama Bull. No. 16.* University, Ala., 1915.

Western States

BOLTON, H. E. **Original Narratives of Early American History: Spanish Exploration in the Southwest, 1542-1706.** xii and 487 pp. Charles Scribner's Sons, New York, 1916. $2.50. 9 x 6.

This volume has performed good service in fulfillment of the aim of the series—to render accessible certain important material on early American history. One-third of the material has heretofore been available in Spanish only, and nearly one-third more is from unpublished manuscripts. In addition two important maps, showing respectively the routes of Oñate and De Léon, are here reproduced for the first time, and the whole series of explorations is exhibited on a map compiled from original data.

From New Spain exploration and conquest gradually carried Spanish dominion to the north, into what is now the southwestern United States. Early plans aimed at the settlement of California. In 1542 the Cabrillo-Ferrelo expedition reached as far north as 42° 30′ N. along the Pacific coast. Half a century later the Vizcaino expedition set out with a well-defined objective: an investigation of the possibilities of founding a port of call and defense for the Manila galleons that were wont to find their most practicable return route in a latitude—about 40° N.—far north of Acapulco. Contemporaneously frontiers were being pushed forward in the pueblo district of New Mexico. The Rodriguez (1581) and Espejo (1582-83) expeditions established lines of approach for the province founded by Oñate at the end of the century. The narratives of Oñate's achievements contain much interesting material of a geographical nature—descriptions of the Indian trading expeditions, "An Account of the Discovery of the Buffalo." Somewhat later the frontier was pushed northward into Arizona. Military posts and Jesuit missions led the van, mining and stock raising followed. Most prominent of the pioneer figures of this region was Father Kino, missioner, colonizer, and geographer. He entered Pimería Alta—that part of Arizona later comprehended in the Gadsden purchase—in 1687. He baptized 4,000 Indians, stimulated settlement in Lower California, executed the first authoritative map of southern Arizona, and in his "Cosmographical Demonstration" proved that California was not an island (see "The Isles of California," by Godfrey Sykes, *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, pp. 745-761). The later seventeenth century saw attention directed towards Texas. The Bosque Larios expedition of 1675 made the first important crossing of the lower Rio Grande, below the confluence of the Pecos. A little later native appeals for help against the Apache influenced the Mendoza-Lopez expedition. Still later the De Léon-Massanet expedition, which, in 1690, founded missions amongst the Tejas, was primarily directed against the reported French occupation of the Gulf Coast.

DILLER, J. S., AND OTHERS. **Guidebook of the Western United States. Part D: The Shasta Route and Coast Line.** 142 pp. Maps, ills., index. *U. S. Geol. Surv. Bull. 614.* Washington, 1915. $1. 9 x 6.

This excellent guidebook and its three companion volumes (reviewed as follows: Overland route, *Bull. Amer. Geogr. Soc.*, Sept., 1915, pp. 697-698; Northern Pacific route, Feb. *Review*, p. 153; Sante Fe route, April *Review*, p. 312) deserve wide circulation. While necessarily restricted in scope and in arrangement by the definite purpose of describing the belt of country adjacent to a railroad route, it is gratifying to note how much of the general physiography and geology of the Pacific Coast is given not only incidentally in the local descriptions but more specifically in the introduction and in footnotes. Remnants of old peneplains and of ocean and river terraces are pointed out at various places from Seattle to Los Angeles and brief explanations given of the crustal movements which can be inferred from them. Peculiarities of stream drainage are frequently noted and their probable evolution described.

Two interesting instances may be mentioned in regions where the regular topographic sheets are available for more detailed study. They are the antecedent course of the Willamette in the gorge between Oregon City and New Era (p. 33) and the superim-

posed course of the Salinas River in the granite upland northeast of the main valley near Santa Margarita, California (p. 117).

Throughout the volume the illustrations are from well-chosen photographs and in general are so well reproduced that they may be utilized in a reflectoscope or converted into lantern slides.

The volume seems remarkably free from errors. The height of Mount Shasta is given on page 54 as 14,350 feet and on page 56 as 14,380 feet—the reading of the contour map. Mr. F. E. Matthes has recently quoted the U. S. Coast and Geodetic Survey as having revised its measurements and reduced the height to 14,162 feet (*Sierra Club Bull.*, Vol. 9, p. 190). Mount Shasta is so well known that it is to be hoped that there may soon be an agreement on the most accurate determination of its elevation. If the public demand makes a second edition of the series necessary, the index, at present confined to a list of railroad stations, should be extended to physiographic features and general geographic topics. RULIFF S. HOLWAY.

MEXICO AND CENTRAL AMERICA

ADAMS, CYRUS C. **Northern Mexico: The Scene of Our Army's Hunt for Villa.** Map, ills. *Amer. Rev. of Reviews*, Vol. 53, 1916, No. 4, pp. 421-423.

—— **Costa Rica, Trade and Commerce of, Report for the Year 1914 on the.** 13 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5553. London, 1916.

GOLDMAN, E. A. **Plant Records of an Expedition to Lower California.** Map, ills., index. *Contrib. from U. S. National Herbarium*, Vol. 16, 1916, Part 14, pp. 309-371. Smithsonian Institution, Washington, 1916. [The route extended throughout the whole length of the peninsula.]

JUDAY, CHANCY. **Limnological Studies on Some Lakes in Central America.** Maps, diagrs. *Trans. Wisconsin Academy of Sci., Arts, and Letters*, Vol. 18, 1915, Part 1, pp. 214-250. [Abstracted in this number, p. 374.]

—— **Nicaragua, How the United States is Helping: The Ratification of the Nicaragua Canal Treaty the Latest Step in the Effort to Promote the Republic's Prosperity.** Map, ills. *Dun's Rev.: Internatl. Edit.*, Vol. 27, 1916-17, No. 2, pp. 39-44. New York.

RAGUZZI, —. **Il Canale di Panama: 1° anno d'esercizio.** 9 pp. [*Boll.*] *Direz. Gen. degli Affari Commerc.*, 1915, No. 17. Minist. degli Affari Esteri, Rome.

Map of Sonora, Chihuahua, and Coahuila, Mexico. [1:100,000.] War College Division, General Staff, [Washington, D. C.], Dec. 1913. Reproduced for the Pan American Union, Washington, D. C., 1914. [Detailed comment on this map will be found in this number under "Geographical Record" on p. 374.]

WEST INDIES

—— **Barbados: Report for 1914-15.** 15 pp. Map. *Ann. Colonial Repts. No. 871.* London, 1916.

—— **Cuban Prosperity.** *South Amer. Journ.*, Vol. 80, 1916, No. 4, pp. 84-85. London. [The extraordinary sugar crop of 1915-16 points to a forthcoming period of prosperity.]

FREEMAN, W. G. **The Influence of the War on Tropical Agriculture.** Diagrs. *Bull. Dept. of Agric. Trinidad and Tobago*, Vol. 14, 1915, Part 4, pp. 103-107. [Deals specifically with three of the principal products of Trinidad and Tobago—cacao, copra, and sugar.]

GARCÉS, A. D. **Informe del Consulado General de Chile en Cuba, sobre la industria de la pesca.** *Bol. de Relaciones Exteriores*, No. 58, 1915, July, pp. 67-71. Santiago, Chile.

GUTIERREZ-LANZA, MARIANO. **The Climate of Cuba.** *Monthly Weather Rev.*, Vol. 43, 1915, No. 12, p. 610. [Author's abstract of a paper read at the Pan American Scientific Congress in Washington, Dec., 1915-Jan., 1916.]

HALL, MAXWELL. **Storms and Hurricanes in Jamaica, 1635-1915.** *Monthly Weather Rev.*, Vol. 43, 1915, No. 12, p. 620.

KUPFER, H. F. **Porto Rico's Increasing Prosperity: Sugar, Coffee, Tobacco and Tropical Fruits Promise Good Yields and Have Profitable Markets.** Map, ills. *Dun's Rev.: Internatl. Edit.*, Vol. 27, 1916-17, No. 2, pp. 53-57. New York.

—— **Leeward Islands: Report for 1914-15.** 22 pp. *Ann. Colonial Repts. No. 876.* London, 1916.

MILLÁS, J. C. **The Origin and Course of West Indian Hurricanes.** *Monthly Weather Rev.*, Vol. 43, 1915, No. 12, p. 611. [Author's abstract of a paper read at the Pan American Scientific Congress in Washington, Dec., 1915-Jan., 1916. "In this paper the results obtained by Father Viñes and the data of the recent investigations carried out by the meteorologic service of the United States are made use of."]

—— **Porto Rico, Trade and Commerce of, Report for the Fiscal Year Ended June 30, 1914, on the.** 17 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5475. London, 1916. [The new Tariff Act passed by Congress in Oct., 1913, has effected a loss on the 1914 sugar crops estimated at about $10,000,000. Had the bill retained its original form and free sugar been admitted after May, 1916, a still more serious blow would have been dealt to the industry.]

—— **Trinidad and Tobago: Report for 1914-15.** 24 pp. Maps. *Ann. Colonial Repts. No. 877.* London, 1916.

VAN HEEKEREN, E. A. A. **Nederlandsch West-Indië in 1915.** *De Indische Gids*, Vol. 38, 1916, No. 2, pp. 190-196. [Review of economic development.]

Map of the island of Porto Rico. 1:120,000. Rand, McNally & Co., New York, [1915?].

SOUTH AMERICA

GENERAL

GOLDSMITH, P. H. **A Brief Bibliography of Books in English, Spanish, and Portuguese Relating to the Republics Commonly Called Latin American, with Comments.** xix and 107 pp. Index. The Macmillan Co., New York, 1915. 7 x 5.

We are awakening from our long-protracted ignorance of Latin America. The neglected countries to the south are becoming subjects of popular study. Bibliographies are in demand. For this "emergency" demand the above bibliography, despite its deficiencies, must have a certain value. There are a few serious omissions. There is no recognition of Colonel Church nor, one may add, of another eminent Amazonian explorer, James Orton. Spruce, who contributed so much to our knowledge of the Ecuadorian and north Peruvian *montaña*, is neglected, likewise Hudson, the naturalist. The Argentine-Chilean boundary disputes provoked much literature of value, including Holdich's "Countries of the King's Award"; yet this most readable book finds no place in the bibliography. From the unknown lands of Paraguay has come recent enlightenment at the hands of Barbrooke Grubb, but the bibliography does not note it nor the commentary on the Jesuit Missions of the adjacent territory, Graham's "A Vanished Arcadia." Raimondi is missing from the writers on Peru, and the necessarily short Ecuadorian list is impoverished by the omission of Whymper's "Travels Among the Great Andes of the Equator." There is no mention of Lloyd's series of Twentieth Century Impressions of South American countries; the volumes on Argentina, Brazil, and Uruguay have been published some time. One wonders over the omission of "Through the Brazilian Wilderness" and deplores, perhaps most of all, that of Walle's "Bolivia," both on account of its intrinsic merits and particularly in view of the exceedingly limited material available on modern Bolivia. The critical comments one need not take too seriously; some, however, are not inapt.

MARQUEZ B, ALBERTO. **Libro Internacional Sud-Americano.** 511 pp. Maps, ills. La empresa Zig-Zag, Santiago de Chile, 1916. 7½ x 10½.

This volume, eloquent indeed of South America, is another of the growing number of contributions to South American propaganda. The specific introduction for its general aim of a more widely known South America was achieved at the San Francisco exposition. The volume comprehends profusely illustrated sections of encyclopedic information on the individual countries, the authorization in each case being due to a member of the diplomatic corps.

—— **Quinine: A South American Gift to Humanity.** Ills. *Bull. Pan American Union*, Vol. 42, 1916, No. 1, pp 61-78. [See the note in this number, p. 375.]

REID, W. A. **Glimpses of South American Activities To-day.** Ills. *Bull. Pan American Union*, Vol. 42, 1916, No. 3, pp. 325-357.

Babson's map of South America for merchants and bankers [showing trade conditions]. 1:18,000,000. Babson's Statistical Organization, Wellesley Hills, Mass., 1915.

British Isles

Babcock, W. H. **The Races of Britain.** *Sci. Monthly*, Vol. 2, 1916, No. 2, pp. 149-169.

Davison, Charles. **Earthquakes in Great Britain (1889-1914).** Maps, diagrs. *Geogr. Journ.*, Vol. 46, 1915, No. 5, pp. 357-374.

Farrow, E. P. **On the Ecology of the Vegetation of Breckland: I, General Description of Breckland and Its Vegetation.** Maps, diagrs. *Journ. of Ecology*, Vol. 3, 1915, No. 4, pp. 211-226. ["The heath district known as the 'Breck Country' lies in the low-rainfall area of East Anglia, its soil is sandy and porous, and it presents the nearest approach to continental steppe conditions to be found in Great Britain. . . . The dominance of heather (*Calluna vulgaris*), a plant of oceanic and sub-oceanic climates, separates the vegetation sharply from that of true continental steppe."]

Holmes, T. V. **On the Evidence as to the Geological Structure of Cumberland Bordering the Solway.** Map. *Geol. Mag.*, Decade 6, Vol. 2, 1915, No. 9, pp. 410-418.

France

—— **Bordeaux, Consular District of, Trade and Commerce of the, Report for the Year 1914 on the.** 54 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5525. London, 1915.

—— **Caffé, Il commercio del, all' Havre nel 1914-1915.** *Rapp. dei Agenti Diplom. e Consol.*, No. 23, Dec., 1915, pp. 11-12. Direz. Gen. degli Affari Commerciali, Minist. degli Affari Esteri, Rome.

Coletti, S. **Condizioni di vita e di lavoro in alcuni bacini carboniferi francesi.** Diagr. *Boll. della Emigrazione*, Vol. 15, 1916, No. 1, pp. 3-51. Rome. [Report of an investigation by the author in his capacity of Italian emigration inspector.]

—— **Fierro en Normandia, El.** *Bol. Soc. Nacional de Minería*, No. 219, Vol. 27, 1915, pp. 419-427. Santiago, Chile.

Garçon, Pierre. **Le cours du Giffre et ses vallées.** Maps, ills. *La Montagne*, Vol. 11, 1915, No. 10-12, pp. 187-207. [Alpine valleys in the department of Haute Savoie.]

Moussu, G. **Le troupeau national français et la guerre.** Ills. *La Nature*, No. 2206, 1916, Jan. 8, pp. 17-21. [Cattle supply.]

Switzerland or the Alps

Michel, Gaston. **Verkehrskarte der Schweiz (Carte du Trafic de la Suisse).** 1:200,000. 47°50′-45°42′ N.; 5°50′-10°30′ E. 8 colors. With two insets: (1) [West-central Europe, showing the main lines of communication.] 1:4,000,000. 5 colors. (2) [Switzerland, showing administrative division of Swiss railroads. 1:900,000.] 7 colors. Engraved by Geograph. Anstalt Kümmerly & Frey, published by Geographischer Kartenverlag, both Bern, [1916].

An excellent map of the transportation lines of Switzerland, equally effective as a wall map to be used at a distance or as a desk map for close consultation. This result is obtained by reinforcing by bands of color the black lines which indicate railroads; while obliterating no details, this produces a bold network of lines which is readily visible at a distance. The ingenious symbolism of the map allows a wide range of expression. Gage and number of tracks are indicated by the kind of black line used; there are also separate symbols for tramway lines, cog-wheel railways, and that typically Swiss means of transportation, the *funiculaire*. The color bands, of a contrasting color, one on each side of a line, indicate by their width the amount of passenger and freight traffic respectively. Similarly, the freight and passenger traffic of a given station is indicated respectively by its symbol and the size of lettering of its name. Some eleven symbols are used for customs bureaus according to their receipts. The routes of the Swiss lake steamers are also differentiated according to the size of their traffic.

The base on which all this is shown is admirably suited to the purpose. Nowhere else has such intensive traffic developed in so rugged a region as in Switzerland, and it is therefore eminently fitting that relief is represented on the map. It must be subdued, however, in order not to mar the main theme; this has been attained by printing the topography in a grayish olive tone which conveys a good general impression of the relief. Closer inspection reveals the fact that the base is an excellent map in itself. Relief is shown by contours (interval 100 meters) and shading. The delicacy of line, especially evident on the glaciers, is the same as on good atlas sheets. Only Swiss

cartography—its high development in itself a geographic response to its environment—could afford to use such excellent material as a mere by-product.

The density of the railway net in a zone between Lakes Constance and Geneva reflects the industrial development of this Alpine Foreland region in contrast with the enclosing mountain regions of the Jura and the Alps. The predominance of natural economic forces over political factors is also illustrated by the customs-exempt transitional areas of the "Zone sarde" and the "Pays de Gex," tributary to Geneva, and the "Zollausschlussgebiet von Samnaun und Sampuoir," the head of a mountain valley whose natural outlet is to the Tyrol. Another point that the map brings out well is the greater volume of the traffic on the St. Gotthard than on the Simplon route; it also shows that the number of passenger trains predominate over freight trains on the Simplon, while both categories are equal on the St. Gotthard. The latest trans-Alpine tunnel, the Lötschberg, opened in June, 1913, which connects Bern directly with Milan, and, before the war, afforded a more direct route than heretofore between Italy and northern France, Belgium, and England, is, of course, indicated.

The only defect is the absence of any indication as to the date used as a basis for the conditions represented.

KREUZKAM, THEODOR. **Wirtschafts- und Verkehrsverhältnisse der Schweiz unter den Wirkungen des Krieges.** *Weltwirtschaft*, Vol. 5, 1915, No. 9, pp. 182-184. Berlin.

GERMANY

DREYER, JOHANN. **Die Moore Pommerns: Ihre geographische Bedingtheit und wirtschaftsgeographische Bedeutung.** Maps, diagrs., ills., bibliogr. *Jahresbericht der Geogr. Gesell. zu Greifswald*, Vol. 14, 1913-14, pp. 1-319. Greifswald, 1914.

If the name of the region described in this treatise were omitted and one were to try to guess its whereabouts, the muskeg lands of northeastern Minnesota would fit equally well. In fact some of the photographs could very easily have been taken in this region. Hence the volume under consideration has a peculiar interest to the American.

The author presents a summation of the conditions in the moorlands of Pomerania, Germany, within 192 pages of text, three extensive tabulations covering 118 pages, a comprehensive bibliography that would seem to include all of the German literature on bogs or swamps, two maps, and nine photographs. Most of the data of years past have never before been presented in available form. The purpose of the author, however, was not merely to compile data, but to present the geographic influences effective in the reclamation of the vast swamp area of Pomerania and to show the possibilties of its economic development.

The theory of climatic and topographic influences upon the formation of a swamp is tested and applied. The writer asserts that the swamp constitutes an index to climatic conditions. It is argued that since a definite type of climate controls swamp building, geologic records that show the former existence of swamps thereby give the key to some of the climates of the past.

The physical and chemical composition of the swamp lands in various stages as found in different parts of the province is given in detail. This should prove of value to those especially interested in the cultivation of similar lands. Of equal value is the discussion of the results of practical work done up to date and the methods whereby success has been attained.

Stettin's supply of vegetables is grown upon these lands. The raising of truck-garden products and the use of the remainder of the land for pasturage to supply the meat and dairy products offer a most promising future. The extraction of peat for fuel, the derivation of ammonia, and the use of certain parts of the soil for medicinal baths are among the industrial uses mentioned. The author concludes that in addition to the products to be derived from swamp lands, the effect of their cultivation upon the elimination or reduction of disease is worth much in itself. EUGENE VAN CLEEF.

HECHT, H. H. **The Motor Routes of Germany Through North-Eastern France and Holland, to the Rhine, the Moselle, the Black Forest, the Thuringian Forest, the Taunus, and Bavaria.** Edited by Gordon Home. xxiv and 456 pp. Maps, ills., index. A. & C. Black, London, 1914. 5s. 8½ x 5½.

A very complete handbook for motorists who, before the war, designed to tour Germany. The route maps and town plans are simply and clearly drawn and are easy to understand. Brief historical information about the different places is given. A large

and well-executed motor map of Germany is added. The book leaves little to be desired in the way of a practical guide for actual use by the experienced motorist.

DAVID H. BUEL.

KRÜGER, GUSTAV. **Über Sturmfluten an den deutschen Küsten der westlichen Ostsee, mit besonderer Berücksichtigung der Sturmflut vom 30./31. Dezember 1904.** Map, diagrs. *Jahresbericht der Geogr. Gesell. zu Greifswald*, Vol. 12, 1909-10, pp. 195-294. Greifswald, 1911.

The Baltic Sea, separated as it is from the North Sea by the narrow passages of the Belts, experiences very slight changes of level due to tidal forces. Like the nearly enclosed Albemarle and Pamlico Sounds, its greatest variations of surface level result from the action of winds in piling water up against the low bordering coasts. Southerly winds drive the water into the Gulf of Bothnia, giving high water around its borders and low water along the shores of southern Sweden and northern Germany. With northerly winds, the condition is reversed, and Trelleborg and Malmö, together with many of the German coast cities, find their streets invaded by the rising waters. The same wind which raises the water level drives high waves against exposed portions of the flooded coasts, enormously increasing the damage done by these "storm tides," as they are commonly called.

Gustav Krüger has performed a useful service in publishing a critical survey of the more important reports on such of these storm tides as have affected the German coast from the earliest trustworthy description of a storm in the year 1044, to the disastrous flood of December, 1904. On the basis of this study of the literature, Krüger presents a chronological table of 79 recorded storm tides and finds that on an average six important disasters of this nature occur in each century. The data for the last three centuries are most complete and permit the author to distinguish periods of frequent storm tides, alternating with periods in which their occurrence is rare. An attempt is then made to correlate the storm-tide period with the Brückner cycle of wet and dry climatic variations, and it is pointed out that the Brückner dry periods of 1781-1805 and 1856-1870 coincide closely with the frequent storm-tide periods 1784-1801 and 1855-1874 respectively. Krüger concludes that periods of frequent storm tides can in general be shown to agree with Brückner dry periods and vice versa. The fact that the period of storm-tide frequency 1736-1750 coincides with the *wet* period 1736-1755, while the frequency period 1820-1825 occurs in the *wet* period 1806-1825, is in apparent disagreement with the author's conclusion.

The final part of Krüger's paper is devoted to an elaborate discussion of the great storm-tide of December 30-31, 1904, including a review of previous descriptions of this event. It appears that westerly winds prepared the way for the coming disaster by driving much water from the North Sea into the Baltic, thereby giving an abnormal height to the surface of the latter. Northeast winds then piled the water up against the low coast of northern Germany to a height in places eight feet above mean water level. The details of areas flooded, coast margins eroded, and artificial structures demolished bring vividly to mind the similar destruction wrought along the New Jersey coast by the great storm of January 4, 1913.

D. W. JOHNSON.

RUSSIA

WILLIAMS, H. W. **Russia of the Russians.** ix and 430 pp. Map, ills., index. Charles Scribner's Sons, New York, 1915. $1.50. 7½ x 5½.

An elevated and scholarly description of the development and present state of Russia and Russian institutions. At the very start the importance and influence of the geographical factor is recognized. A striking contrast is drawn between an island-dwelling people, like the British, and a plains-dwelling people, such as the Russians, and the whole course of Russian history is shown to be the outcome of life on a plain, increasing and expanding until the barriers of sea and mountain are reached. The account is a candid and unbiased statement of facts as they are in Russia—its bureaucracy and its constitution, its press, the church and the people, its literature, music, theater, art, and architecture, its peasants and landed proprietors, and finally its great city, now known as Petrograd. A chapter on the *intelligentsia* is worthy of note. In this, the educated class, Russian idealism and devotion to the altruistic service of humanity find their highest expression.

DAVID H. BUEL.

BIENAIMÉ, GEORGES. **La Pologne.** *La Géogr.*, Vol. 30, 1914-15, No. 5, pp. 337-358. Paris.

BORISSOV, A. **Amélioration des voies ferrées dans le nord de la Russie.** *Bull. Soc. Géogr. Comm. de Paris*, Vol. 37, 1915, No. 10-12, pp. 305-326. [Deals with the

Viatka-Kotlas, Vologda-Archangel, and Petrograd-Kola routes, all shown on the map in the February *Review*, p. 130, and the last two described in the article which it illustrates.]

—— **Cotton Industry in 1915, Russian.** *Commerce Repts.*, 1916, No. 48, pp. 812-813. Bureau of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C., 1916. [Reprinted from the *Journ. Russian-Amer. Chamber of Comm.*, Nov., 1915.]

—— **Odessa, Consular District of, Trade of the, Report for the Year 1914 on the.** 80 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5544. London, 1915.

—— **Russian Commercial Ports.** *Commerce Repts.*, Ann. Series, 1916, No. 42. pp. 718-719. Bur. of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C. [From the *Journ. Russian-American Chamber of Comm.*, Dec., 1915.]

—— **Ukraine, The Cry of.** Map. *Amer. Rev. of Reviews*, Vol. 53, 1916, No. 4, pp. 485-486. [Based on an appeal published by the National Ukrainian Association pleading the racial unity of the Ukrainians, at present politically divided as Little Russians in Russia and Ruthenians in Galicia and northern Hungary.]

Austria-Hungary

Gayda, Virginio. **Modern Austria: Her Racial and Social Problems, with a Study of Italia Irredenta.** [Abridged translation, from the second edition of the Italian original, by Z. M. Gibson and C. A. Miles.] 350 pp. Index. Dodd, Mead & Co., New York, 1915. $3. 9 x 5½.

None but an Italian conscious of the intertwining of his country's history with that of Austria and mindful of his countrymen's liberation from the Austrian yoke could have interpreted the twilight of the Austro-Hungarian monarchy with such lucidity. By the spirited rendering which makes the work accessible in an English dress the translators have extended their good services to two hemispheres.

Passing in review the various Austrian nationalities, the author not unnaturally dwells longer on the unredeemed portions of his country. The scientific foundation of the peopling of the Trentino by Italians is correctly stated to be a result of the prolongation of Italian valleys north of the Italo-Austrian frontier. On the other hand, to pretend that Istria with its "Italian population" should belong to Italy is to affirm the unwarranted, since the peninsula is peopled mainly by Slavs, its western edge alone having been settled by Italians. A distinct loss in the value of the work is incurred by occasional slips of this character.

The book stands somewhat apart from publications dealing with the same subject in that it gives an unusually brilliant exhibition of the peculiarities of Austro-Hungarian social life which owe their distinctiveness to the forcible mingling of peoples of incompatible temperament.

De Lucchi, Guido. **Trentino e Tirolo (Aprile 1914).** 82 pp. [*Boll.*] *Direz. Gen. degli Affari Commerc.*, 1915, No. 16. Minist. degli Affari Esteri, Rome.

[Five maps in one:] 1, Ethnographical map of Austro-Italian frontier, 1:2,000,000; 2, The western Trentino, physical, 1:1,000,000; 3, Present and proposed frontiers in the Trentino, 1:1,000,000. 4, Present and proposed frontiers north of Trieste, 1:1,000,000; 5, The western frontier of Montenegro, 1:2,000,000. Accompanies "The Southern Frontiers of Austria" by D. W. Freshfield, *Geogr. Journ.*, Vol. 46, 1915, No. 6.

Balkan States, including Rumania

Newbigin, M. I. **Geographical Aspects of Balkan Problems in Their Relation to the Great European War.** ix and 243 pp. Maps. G. P. Putnam's Sons, New York, 1915. $1.75. 8½ x 5½.

This timely volume by the editor of the *Scottish Geographical Magazine* is intended "to summarize those geographical facts which made the Balkan Peninsula the potential storm-center of Europe." Physical, political, and historical geography are laid under tribute to broaden the reader's acquaintance with the complicated issues which render the Balkan "problem" so difficult from every point of view. The folded mountains of the western coast, which shut off the central and eastern states from free communication with Italy, the central upland of Rhodope and the important furrows formed by the Morava-Vardar and Morava-Maritza valleys, and the various rivers characterized by "unnatural," right-angled bends, are discussed at length, and their effects on the migrations, political development, and racial peculiarities of the people considered. A chapter is devoted to the past history and probable future development

of the main trade routes of the peninsula, in which emphasis is laid on the significant fact that both the ancient Roman roads and the modern railways were built to cross the region rather than to develop it. Special attention is given to the policies of Austria and Turkey in the Balkans, and it is shown that these policies have been largely affected by the physical features of the region. The influence of climate is not overlooked, and the agricultural practices of the different states are compared. Each chapter is followed by a list of references to the literature of the subjects discussed; and the book is illustrated by several text maps and an excellent orographical map in colors, most of which have already appeared with the author's earlier brief article on "The Balkan Peninsula: Its People and Its Problems" in the *Scottish Geographical Magazine* for June, 1915.

It is in her discussions of physiographic changes in the Balkan Peninsula that the reader must hesitate to follow the author with full confidence. In particular, the treatment of drainage modifications in Chapter V is open to criticism, since it is largely based on two erroneous assumptions: that the submergence of the lower part of a river by increasing the average steepness of its course increases the erosive power of its headwaters; and that a sharp elbow turn in a river ordinarily means that river capture has taken place. The series of captures described by the author are in the highest degree improbable. However, such defects as these may be charged not so much to original mistakes of the author as to a failure in discriminating between probable and improbable theories as presented by other workers in the Balkan field. As a whole the book is a valuable summary of many important phases of Balkan geography.

D. W. JOHNSON.

ITALY

MAGRINI, GIOVANNI. **Studi fitogeografici sulla laguna di Venezia.** viii and 348 pp. Index, bibliogr.; separate volume of tables. *Ufficio Idrografico Pubbl. N. 54.* R. Magistrato alle Acque, Venice, 1913.

The Italian Hydrographic Office has published in this volume an elaborate study of the vegetation of the coast of the Adriatic Sea from the mouth of the Tagliamento to that of the Adige. A full and well-illustrated description is given of the littoral, lacustrine, and subcontinental portions of the area. This primary subdivision is made on the basis of physiography rather than vegetation, for in each area is to be found a series of communities, from dunes or marshes to arborescent or shrubby vegetation. The descriptive treatment is chiefly floristic, and no attempt is made to work out the successional phenomena involved. The littoral area embraces moving and stable dunes, meadows, and woods of *Quercus ilex* and the introduced *Pinus pinea*. The lacustrine area presents conditions varying from moist to dry and from saline to fresh and is mainly covered by halophytic flats or fresh marshes. The subcontinental area exhibits several types of marsh and a low woodland of *Quercus pedunculata* and other broad-leaved trees. Much space is devoted to the discussion of the broader aspects of work of this character, as for example the general relation of environmental conditions to plant activity, the "adaptive" features of plant structure, variability, polymorphism, etc. There is a full account of the history of botanical work in the vicinity of Venice, a list of the flora with habital notes, and a lengthy bibliography of papers on the ecology of dunes and littoral and palustrine areas.

This work has been done with such thoroughness and such adequate attention to its general bearings that subsequent investigators of similar areas in southern Europe will be free to make their work of a more intensive character. FORREST SHREVE.

—— **Annuario Statistico Italiano: Seconda Serie, Vol. IV: Anno 1914.** xii and 502 pp. Maps, diagrs., index. Direz. Gen. della Statistica e del Lavoro, Rome, 1915. 10½ x 7½. [The fourth volume of the revised series. Contains under a single cover the statistical data collected by the various Italian government bureaus. Tables often accompanied by analytical notes. Valuable information on Italy's colonial domain.]

CORRINO, EPICARMO. **L'emigrazione italiana dopo la guerra, e la politica relativa.** *Riv. Colon.*, Vol. 10, 1915, No. 11, pp. 654-669. Ist. Colon. Italiano, Rome.

DU RICHE PRELLER, C. S. **The Moraine Walls and Lake Basins of Northern Italy.** Maps, diagr. *Geol. Mag.*, Decade 6, Vol. 2, 1915, No. 9, pp. 403-410.

DU RICHE PRELLER, C. S. **The Carrara, Massa, and Versilia Marble District.** Map, diagrs. *Geol. Mag.*, Decade 6, Vol. 2, 1915, No. 12, pp. 554-565.

—— **Emigrazione italiana per l'estero avvenuta nell' anno 1914.** *La Geogr.*, Vol. 3, 1915, No. 7-10, pp. 375-378. Novara.

GORTANI, MICHELE. **La frana di Clauzetto (marzo-aprile 1914).** 28 pp. Map,

diagrs., ills. *Ufficio Idrografico Pubbl. N. 65.* R. Magistrato alle Acque, Venice, 1915. [Describes an earth-slip in the foothill region of the Venetian Alps. The geological maps and profiles and the photographs illustrate conditions before and after the slip.]

GRAZIA, PAOLO DE. **Frane recenti in Basilicata.** Ills. *La Geogr.*, Vol. 3, 1915, No. 7-10, pp. 319-329. Novara. [Recent earth-slips in southern Italy.]

LEONE, ANDREA. **A proposito di alcune recenti guide dell' Ossola.** *La Geogr.*, Vol. 3, 1915, No. 7-10, pp. 330-337. Novara. [Guide books on the Alpine valley forming the Italian adit to the Simplon Tunnel route.]

MAGRINI, GIOVANNI. **Superficie dei bacini montani della regione veneta.** 51 pp. Maps. *Ufficio Idrografico Pubbl. N. 62.* R. Magistrato alle Acque, Venice, 1914. [Planimetric measurements of the mountain sections of the river basins of the province of Venice, based on the Italian topographic map in 1:100,000. The basins and their subdivisions are outlined on transparent maps in 1:200,000 accompanying the report which may be superposed for purposes of comparison on the sheets of the Italian topographic map on that scale.]

MAGRINI, GIOVANNI. **La segnalazione del tempo per il porto di Venezia.** 19 pp. Diagrs., ills. *Ufficio Idrografico Pubbl. N. 67.* R. Magistrato alle Acque, Venice, 1915.

—— **Migrazioni periodiche interne (anni 1910-1911).** *La Geogr.*, Vol. 3, 1915, No. 7-10, pp. 378-381. Novara.

POLI, ASER. **Per la pronunzia dei nomi geografici italiani.** *La Geogr.*, Vol. 3, 1915, No. 7-10, pp. 350-354. Novara.

TARAMELLI, TORQUATO. **Le montagne dove si combatte.** Ills. *La Geogr.*, Vol. 3, 1915, No. 7-10, pp. 294-313. Novara. [Alpine battlefields of the Italo-Austrian frontier.]

—— **Uva e vino: produzione media del quinquennio 1909-1913.** *La Geogr.*, Vol. 3, 1915, No. 7-10, pp. 371-375. Novara.

ZAPPULLA, C. N. **Le Eolie.** Bibliogr. *L'Esplorazione Commerc.*, Vol. 30, 1915, No. 10-11, pp. 365-377. Milan. [The Lipari, or Aeolian, Islands.]

AFRICA

General

ANKERMANN, BERNHARD. **Verbreitung und Formen des Totemismus in Afrika.** Map. *Zeitschr. für Ethnologie*, Vol. 47, 1915, No. 2-3, pp. 115-180. Berlin. [With a map of Africa showing the distribution of totemism.]

MIGEOD, F. W. H. **Notes on West Africa according to Ptolemy.** Diagr. *Journ. African Soc.*, No. 56, Vol. 14, 1915, pp. 414-422. [With a note by Sir Harry H. Johnston, pp. 423-426.]

QUESNEL, G. **Les Allemands en Afrique.** *Soc. Languedocienne de Géogr.*, Vol. 38, 1915, No. 3, pp. 159-193. Montpellier.

Congo Basin and Lower Guinea

—— **Angola Portoghese: Note su una regione dell' altipiano di Benguella.** *Rapporti dei RR. Agenti diplomatici e consolari N. 16*, pp. 1-5. Direz. Gen. degli Affari Comm., Minist. degli Affari Esteri, Rome, August, 1915.

DINIZ, FERREIRA. **Protecção e assistencia ás populações indigenas da provincia de Angola.** *Bol. Soc. de Geogr. de Lisboa*, Vol. 33, 1915, No. 7-8, pp. 274-319. [A social and economic study.]

PEREIRA DO NASCIMENTO, J. **La colonisation du plateau sud d'Angola.** *Bol. Soc. de Geogr. de Lisboa*, Vol. 33, 1915, No. 7-8, pp. 253-273; No. 9-10, pp. 351-355. [Of the 40,000 emigrants annually leaving Portugal 90 per cent go to Brazil. Many from Madeira and the Azores prefer the United States (Boston and San Francisco); the remainder is directed to the Hawaiian Islands, Trinidad, and British Guiana. So far Portugal has failed to establish an emigration current to her African colonies. The suitability of the Benguella plateau for such a purpose is favorably considered in this article.]

SCHWETZ, J. **Preliminary Note on the General Distribution of *Glossina Palpalis, Rob-Desv.*, in the District of Lomami, Belgian Congo.** Map. *Annals of Tropical Medicine and Parasitology*, Vol. 9, 1915, No. 4, pp. 513-526. Liverpool. [On the conditions of moisture and vegetation determining the distribution of the tsetse-fly.]

EAST AFRICA

HOBLEY, C. W. **The Alleged Desiccation of East Africa.** Map, diagr., ills. *Journ. East Africa and Uganda Nat. Hist. Soc.*, Vol. 5, 1916, No. 9, pp. 4-16. (Reprinted, without statement to that effect, from *Geogr. Journ.*, Vol. 44, 1914, pp. 467-477.)

Northward of Mombasa the East African coast is thickly studded with ruins of age and origin unknown. By the author of the above paper they are considered to represent a colonizing venture on the part of the Himyaritic Arabs at a period of greater rainfall when the hinterland of this part of British East Africa and Somaliland enjoyed better facilities for stock-raising. The objective of the coast settlements would then be trading between this richer hinterland and the densely peopled *Arabia Felix*. The paper also takes up a short discussion of evidences of climatic change in geological time. It was contributed in response to Prof. J. W. Gregory's survey of evidence for world desiccation, "Is the Earth Drying Up?" (*Geogr. Journ.*, Vol. 43, 1914).

SCHLIKKER, BERNHARD. **Beitrag zu den Regenverhältnissen im küstennahen Gebiete von Deutsch-Ostafrika.** Inaugural-Dissertation . . . Univ. Münster. 42 pp. Maps, diagrs. E. S. Mittler & Sohn, Berlin, 1915. 12 x 9½.

German East Africa is a region for which climatic data have been accumulating with remarkable rapidity in the last few years. Von Danckelmann, Maurer, and others have already given us valuable reports on its climate. Particular interest attaches to the rainfall, because of the very striking differences which have been found to exist in the amounts of precipitation in different parts of the area. There are all gradations, from a dry steppe to tropical abundance of vegetation. The available rainfall data for the littoral portion of German East Africa (east of 36½° E.) are selected and reduced in this thesis, and on them is based a new rainfall map (listed below), which differs in some respects from the earlier maps of Fitzner (1907) and Maurer (1900). The maximum mean annual rainfall exceeds 2000 mms. (78.74 ins.) on some of the higher elevations, and the minimum is below 750 mms. (29.53 ins.). The six months December to May (or November to April) are the rainiest part of the year. The district thus belongs to the southern hemisphere régime of a summer (high sun) rainfall maximum. The variations in the annual amounts are considerable over the whole area. The results presented in Doctor Schlikker's monograph are acknowledged to be preliminary, and as such will doubtless be subject to more or less modification in future years, as more reliable data, covering longer periods, become available for discussion. Nevertheless, this new rainfall map and the critical discussion accompanying it will for a good many years, at any rate, remain the standard publication for this portion of eastern Africa.

R. DEC. WARD.

Niederschlagskarte des östlichen Deutsch-Ostafrika. Entworfen v. Bernhard Schlikker. 1:2,000,000. Accompanies "Beitrag zu den Regenverhältnissen im küstennahen Gebiete von Deutsch-Ostafrika," von B. Schlikker, E. S. Mittler & Sohn, Berlin, 1915. [See review immediately above.]

SOUTH AFRICA

CALDECOTT, W. A. **Some Features of the Rand Gold Mining Industry.** *South African Journ. of Sci.*, Vol. 12, 1915, No. 4, pp. 113-123. Cape Town.

—— **Commerce de la France et de ses colonies avec l'Afrique du Sud britannique, Note sur le.** *Bull. Écon. du Gouv. Gén. de la Colon. de Madagascar et Dépend.*, Vol. 15, 1915, No. 1, pp. 129-139. [In 1913, a normal year, total trade between British South Africa and France and the French colonies was less than 1 per cent.]

FULLER, C. **Termite Economy.** *South African Journ. Sci.*, Vol. 12, 1915, No. 2, pp. 60-64. Cape Town. [The author claims that the "park-formation" in South Africa is entirely due to termite activities.—Entry taken from review in *Rev. of Applied Entomology, Ser. A: Agricultural*, Vol. 3, 1915, Part 12, pp. 756-757, Imperial Bureau of Entomology, London.

PÉRINGUEY, L. **The Bushman as a Palaeolithic Man.** *Trans. Royal Soc. of South Africa*, Vol. 5, 1915, Part 3, pp. 225-236. Cape Town.

ASIA

TURKEY IN ASIA, ARABIA, CAUCASIA, IRAN

JASTROW, MORRIS, JR. **The Civilization of Babylonia and Assyria: Its Remains, Language, History, Religion, Commerce, Law, Art, and Literature.** xxv and 515 pp. Map, ills., index. J. B. Lippincott Co., Philadelphia and London, 1915. 9½ x 6½.

This survey of the ancient civilization of a natural region has the advantage of being

presented by a fully qualified worker. It shows in the main that human progress in Mesopotamia has traveled northwards along the channels provided by its great twin river system. Copious translations of tablets bring the daily life of the Babylonians and Assyrians within the reader's range of vision. The conditions under which the farmers of Babylon worked their artificially irrigated lands or those under which the trader of Nineveh carried on his commerce are made clear. Social conduct in the great cities is revealed. Tenure of real estate, laws regarding personal property, marriage, and divorce, worship of different cults in their respective sanctuaries, are so many fragments which the author has assembled in the endeavor to create a mosaic of the complex life formerly led by the dwellers on the banks of the Tigris and Euphrates.

The relation of the subject to time is presented far more satisfactorily than that to space. True, some archeologists might have preferred to see the date of the Hammurabi period set at a century earlier than *circa* 2000 B. C., as given on page 54. But the last word in both Babylonian and Assyrian chronology has not yet been stated. In dealing with the position of these civilizations on the map, however, the facts are not quite as uncertain. It is doubtful whether the physical conditions prevailing at the time in which we obtain these early glimpses of political and social conditions have changed appreciably. The confinement of culture to the truly Mesopotamian area, its backward state in the desert on the west or toward the mountains on the east are facts which influenced Babylonian and Assyrian civilization, especially the latter. The northerly spread of progress can be explained geographically with these considerations in mind. That is why the lack of a preliminary description of the aspect of the land on which this remarkable evolution has taken place is to be deplored. That is also why we think that the liberality which has presided over the selection of the illustrations could have been extended most advantageously to a choice of maps on which the physical foundations of Babylonian and Assyrian history would have been represented.

Manchuria, Korea, Japan

Clement, E. W. **A Short History of Japan.** x and 190 pp. Map, ills., index. University of Chicago Press. Chicago, 1915. $2.50. 8 x 5. [An appendix entitled "Physiography" contains a conventional enumeration of geographic elements.]

Muñoz, Carlos. **Memoria anual del cónsul general de Chile en el Japón correspondiente a 1914.** *Bol. de Relaciones Exteriores*, No. 59, 1915, August, pp. 1-71, Santiago, Chile.

—— **Nagasaki, Trade of, Report for the Year 1914 on the.** 21 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5535. London, 1915.

—— **Yokohama, Consular District of, Trade of the, Report for the Year 1914 on the.** 25 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5545. London, 1916.

China

—— **Pakhoi, Consular District of, Trade of the, Report for the Year 1914 on the.** 8 pp. Map. *Diplomatic and Consular Repts.*, Ann. Series, No. 5554. London, 1916.

—— **Port Trade Statistics and Reports: Frontier Ports (Lungchow to Yatung) and Kiaochow Statistics.** 86 pp. *China Maritime Customs Statist. Series Nos. 3 and 4 (Returns of Trade and Trade Repts.)*, 1914, Part 2, Vol. 5. Shanghai, 1915.

—— **Trade, Analysis of Foreign: Exports.** 443 pp. *China Maritime Customs Statist. Series Nos. 3 and 4 (Returns of Trade and Trade Repts.)*, 1914, Part 3, Vol. 2. Shanghai, 1915.

India

Fripp, M. **Irrigation in India, With Especial Reference to Influence on Topography.** *Geogr. Teacher*, No. 42, Vol. 8, 1915, Part 2, pp. 118-124. London. [Abstracted in the April *Review*, p. 302.]

Hayden, H. H. **The Mineral Production of India During 1914.** *Records of Geol. Surv. of India*, Vol. 45, 1915, Part 3, pp. 158-208.

Martineau, Alfred. **Les origines de Mahé (de Malabar).** Maps. *Rev. de l'Histoire des Colonies françaises*, Vol. 3, 1915, Quart. 1, pp. 5-98; Quart. 2, pp. 129-234; Quart. 4, pp. 431-536. Paris.

Smith, J. A., Jose de Olivarez, and J. O. Laing. **British India: Calcutta, Madras, Karachi.** 32 pp. *Suppl. to Commerce Repts.*, Ann. Series, 1915, No. 50a. Bur. of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C.

VOLTERRA, E. T. **L'India e la penetrazione economica italiana.** *Riv. Colon.*, Vol. 10, 1915, No. 11, pp. 633-653; No. 12, pp. 709-724. Ist. Colon. Italiano, Rome.

[Topographic map of India]. 1:253,440. (a) Without altitude tints. Sheets: 46L; 47M; 48L; 54I, J, M; 55B, C, D, F, G, K, L, O; 56B, C, J; 63A, C, D, F, G, H, K, L; 64D, O, P; 65A, K, L, M, N, O; 74A, B, I; 85M, 94F. (b) With altitude tints. Sheets: 39J; 43C; 48L; 55L; 85M; 94F. Survey of India, Calcutta, 1913-15.

India and Adjacent Countries. 1:1,000,000. Sheets: 18; 65 and part of 66; 92. Survey of India, Calcutta, 1913-15.

AUSTRALASIA AND OCEANIA

AUSTRALIA, NEW ZEALAND

DUNCAN, NORMAN. **Australian Byways.** 294 pp. Ills. Harper & Brothers, New York, 1915. $1.75. 8½ x 5½.

A British traveler's story of his tour from England, through the hinterland of Australia, thence to Papua, Thursday Island, and Singapore. To him sampans "sob" and lighthouses are "sun-soaked." The personal peculiarities of his fellow travelers are described in a breezy, familiar vein. The most interesting chapter is taken up with an account of the unusual powers of the blacktrackers, or bushmen, who trace criminals by their footprints, in a way that would excite the envy of a Sherlock Holmes. They are said to discern from the traces of the feet of their quarry not only the direction of flight but the height, weight, age, and physical condition of the person they are tracking. The exploits of the Queensland Mounted Police parallel the deeds of daring of the Northwest Mounted Police of Canada. The book makes entertaining reading for those who are fond of works of travel written in a conversational style.

DAVID H. BUEL.

TAYLOR, GRIFFITH. **The Climatic Control of Australian Production.** 32 pp. Maps, diagrs. *Commonwealth Bur. of Meteorol. Bull. No. 11.* Melbourne.

In view of the postponed publication of the Federal Atlas of Australia the editor-elect has here brought together some of the important data in hand for a study of the distribution of three leading Australian products—cattle, sheep, and wheat. From the isothermal and isohyetal relations of the present distribution—shown in map form—in the several provinces future possibilities are deduced. In the better developed eastern areas the principal control of cattle appears to be the 20-inch isohyet. Much of the east, at least of the southern portion, has attained its maximum capacity for cattle, but vast areas, climatically suitable, await development in the Northern Territory and the Kimberley district of Western Australia. Sheep, in general occupying areas complementary to cattle, find optimum conditions in regions with a rainfall of 15 to 20 inches in Queensland, somewhat higher to the south. The southwestern portion of Western Australia, analogous in many respects to the great sheep-grazing fields of New South Wales, offers the greatest prospects for expansion. In respect of wheat the 10-inch isohyet for the growing season exercises the primary control, with 20 or 15 inches to 10 inches as the optimum rainfall over most of the country. Of virgin regions still remaining, parts of New South Wales and Western Australia are suitable for cultivation similar to that at present obtaining. So far all the wheat grown is harvested in summer, and the temperature of the growing season appears to have been an important control. Climatic comparison with wheat-producing regions in the United States (Texas) and northern India show respective likeness with the Brisbane district of Queensland and the east-central part of that province. By the introduction of new varieties, the durum wheat, for example, northward extension of the wheat-growing zone seems possible.

BALL, L. C. **The Einasleigh Freehold Copper Mine, N. Q.** 31 pp. Maps, diagrs., ills. *Queensland Geol. Surv. Publ. No. 246.* Brisbane, 1914.

DIXON, RUSSELL. **Index (No. 5) to Publications Nos. 215 to 226 (Vol. 3 of New Series).** 52 pp. *Geol. Surv. of Queensland Publ. No. 227.* Brisbane, 1914.

FRASER, MALCOLM. **Statistics of the Dominion of New Zealand for the Year 1914, Vol. 2: Shipping and Trade.** xx and 472 pp. Index. Wellington, 1915.

GODFREY, J. R. **Report upon the Ardlethan Tinfield.** 77 pp. Diagrs. *New South Wales Geol. Surv. Mineral Resource Series No. 20.* Sydney, 1915.

HUTCHINS, D. E. **The Forests of Australia.** *Trans. Royal Scottish Arboricultural*

Soc., Vol. 30, 1916, Part 1, pp. 34-43. Edinburgh. [From an article contributed to the *Melbourne Argus* by the author.]

QUAYLE, E. T. **Relation Between Cirrus Directions as Observed in Melbourne and the Approach of the Various Storm Systems Affecting Victoria.** 27 pp. Maps, diagrs. *Commonwealth Bur. of Meteorol. Bull. No. 10.* Melbourne, 1915. [Abstracted in this number, pp. 376-377.]

SAINT-SMITH, E. C. **Geology and Mineral Resources of the Stanthorpe, Ballandean and Wallangarra Districts (with Notes on the Silver Spur Mine, Texas), Southern Queensland, 1913.** 165 pp. Maps, diagrs., ills. *Queensland Geol. Surv. Publ. No. 243.* Brisbane, 1914. [From the inception of mining operations in 1872 to the end of 1912 the Stanthorpe district accounted for 36.7 per cent of the total tin output of Queensland.]

—— **Water Supply and Irrigation in Australia.** *Geogr. Journ.*, Vol. 46, 1915, No. 5, pp. 380-384.

Geological map of New South Wales. 1:1,000,000. Department of Mines, Sydney, 1914.

POLAR REGIONS

ANTARCTIC

PRIESTLEY, R. E. **Antarctic Adventure: Scott's Northern Party.** 382 pp. Maps, diagrs., ills., index. E. P. Dutton & Co., New York, 1915. $5. 9 x 5½.

This is the story of Captain Scott's northern party on his last expedition to Antarctica. It numbered six men under the leadership of Commander V. L. A. Campbell, R. N. It was sent from Scott's base camp at Ross Island in January, 1911, to Cape Adare, over 400 miles north, to make geological, zoölogical and meteorological studies there and along the coast to the south. The book is purely popular, with only occasional references to the scientific work, all details of which were reserved for the scientific reports of the expedition.

The author was the geologist and meteorologist. His book gives vivid impressions of the environment, including animal life. It is good reading, though too prolix in its chronicle of the most trivial details of personal relations and ordinary incidents during their first happy and prosperous year.

But there is nothing commonplace in the history of the second year, farther south near Evans' Coves, where the six men, through the darkness of the winter night, fought for bare life in such misery as explorers have seldom met. They lived through it, though reduced to half their weight, and sledged south to the main camp two years after they had left it; and the first news they heard was of Scott's tragic death.

In January, 1912, the *Terra Nova* took them south to the second field of their work within view of Mt. Nansen. The vessel was to return for them in about a month but she never came. In fact, she made three attempts to reach them but was stopped by heavy pack ice and finally went on to Australia. The men had neither food nor clothing to meet another winter but they had to face the situation. Their supplies were nearly exhausted and, when winter came, they had not succeeded in killing enough seal and penguin to last through.

They tunneled a large snowdrift, and in this hole in the snow, walled in with ice blocks and biscuit boxes, they existed for seven months. Their cave was nine by twelve feet in size. Two tents were used as cook rooms, for it was not safe to heat the cave. Blubber, with unraveled rope for lampwick, supplied dim illumination. Soon after darkness came they were reduced to half rations, with a biscuit apiece daily and an occasional bit of sugar, chocolate, or cocoa. Living almost altogether on a meat diet, they suffered from the lack of carbohydrates but discovered that seal liver supplied this need to some extent. The smokers suffered much when their supply of tobacco gave out.

The party was finally reduced to one meager meal a day and was facing starvation when, on May 6, the hunters had the great good fortune, in the dim light, to kill four emperor penguins that were in splendid condition and dressed over eighty pounds of meat each. This supply of good food saved their lives. They much preferred penguin to seal meat, but it was the latter that pulled them through, for three large seals came next into the larder, and there was meat and blubber till plenty of game came with the sunrise in August. The men were their own relief party. They hauled a sledge down the coast and rejoined their comrades at Ross Island. They were not able to do any scientific work in their second year.

CYRUS C. ADAMS.

SEWARD, A. C. **Antarctic Fossil Plants.** 49 pp. Maps, ills. *British Antarctic ("Terra Nova") Expedition, 1910, Natural History Report: Geology,* Vol. 1, No. 1. British Museum (Natural History), London, 1914. 6s. 12½ x 9½.

The possible avenues by which floras have been distributed over the globe, not only in past geologic time but at the present day, have always been matters of extreme interest. From known facts of distribution it has long seemed that the vast Antarctic region must hold the key to much of this history. On this point Darwin wrote: "Nothing is more extraordinary in the history of the vegetable kingdom, as it seems to me, than the apparently very sudden or abrupt development of the higher plants. I have sometimes speculated whether they did not exist somewhere during long ago on an extremely isolated continent, perhaps near the South Pole." The recent revival of activity in Antarctic exploration has supplied data which in part at least confirms these conjectures. Thus, the Swedish expedition discovered an extensive Jurassic flora on Graham Land, and this suggests an avenue by which this widespread flora reached from Africa through Gondwana Land (Antarctica) to the South American continent. Professor Seward's report on the material secured by the Scott parties carries the presence of fossil plants very much farther south than ever before known. They are from five localities between the Priestley Glacier, 74° S., to Buckley Island, 85° S., the latter less than 350 miles from the Pole. The rocks in which the plant remains were found have been designated the Beacon Sandstone and extend from Mt. Nansen to at least as far south as 85°, or a distance of 700 miles; it has a maximum thickness of over 1,500 feet and is composed of fine-grained sandstones and shales with occasional coal seams and carbonaceous streaks. F. H. KNOWLTON.

MATHEMATICAL GEOGRAPHY

SURVEYING AND GEODESY

DAVIS, R. E., AND W. H. RAYNER. **Unusual Methods Simplify Topographic Survey of Rough Wooded Area.** Diagrs. *Engineering Rec.*, Vol. 73, 1916, No. 10, pp. 316-317. [Describes surveying a tract in Missouri on the scale of 1:600 with 2-ft. contours at a cost of $3.34 per acre.]

JOLY, J. **On a Method of Estimating Distances at Sea in Fog or Thick Weather.** Diagr. *Proc. of the Royal Soc.*, Series A, Vol. 92, 1916, No. 637, pp. 170-175.

SANDE BAKHUYZEN, H. G. VAN DE. **Comparison of the Dutch Platinum-Iridium Metre No. 27 with the International Metre M, as Derived from the Measurements by the Dutch Metre-Commission in 1879 and 1880, and a Preliminary Determination of the Length of the Measuring-Bar of the French Base-Apparatus in International Metres.** *Proc. Section of Sciences, Kon. Akad. van Wetenschappen te Amsterdam,* Vol. 17, Part 1, pp. 311-318. Dec., 1914.

SANDE BAKHUYZEN, H. G. VAN DE, N. WILDEBOER, AND J. W. DIEPERINK. **Comparison of the Measuring Bar Used in the Base Measurement at Stroe with the Dutch Metre No. 27.** *Proc. Section of Sciences, Kon. Akad. van Wetenschappen te Amsterdam,* Vol. 17, Part 1, pp. 300-311. Dec., 1914.

PHYSICAL GEOGRAPHY

GEOPHYSICS

DE SITTER, W. **On Isostasy, the Moments of Inertia, and the Compression of the Earth.** *Proc. Section of Sciences, Kon. Akad. van Wetenschappen te Amsterdam,* Vol. 17, Part 2, pp. 1295-1322. June, 1915.

SWANN, W. F. G. **Atmospheric Electric Observations Aboard the "Carnegie," 1915.** *Monthly Weather Rev.*, Vol. 43, 1915, No. 12, p. 611. [Author's abstract of a paper read at the Pan American Scientific Congress in Washington, Dec., 1915-Jan., 1916.]

WALKER, G. W. **A Portable Variometer for Magnetic Surveying.** Diagrs. *Proc. Royal Soc.*, Series A, No. 639, Vol. 92, 1916, pp. 313-321.

GEOLOGY AND GEOMORPHOLOGY

LAWSON, A. C. **The Epigene Profiles of the Desert.** Ills. *Bull. Dept. of Geol., Univ. of California,* Vol. 9, 1915, No. 3, pp. 23-48.

The alluvial fans, rock slopes, and flood erosion of dry regions are now sufficiently well known to warrant an attempt to treat them inductively. Professor Lawson makes this attempt in order to see whether it is possible to obtain new light upon the conclu-

sions which have hitherto been derived deductively. In this he is successful. He discusses the processes by which weathering takes place and fans are built up at the base of mountain slopes. He speaks of the materials thus deposited as the "embankment"—a term which may be desirable but which to the reviewer constantly calls up a picture quite different from that intended by the author. A much better new term is "panfan," by which the author means the combined fans which together form the frontal apron of deposits at the base of a slope. In other publications he has used the term "fanglomerate" for the materials of such fans. These two terms are likely to be used permanently.

The chief new point in Professor Lawson's paper is the hypothesis that the comparatively smooth and gently sloping expanses of almost naked rock which are often found at the base of desert mountains are probably not due to sheet-flood erosion, as supposed by McGee. The recession of the base of a mountain by normal erosion is a process which goes on continually. Its details are here carefully explained. Erosion on the newly formed plain is soon checked by the deposition of fanglomerate, which covers it with a thin veneer. When the mountain is worn sufficiently low so that detritus is no longer brought from it to the fans, erosion may attack the veneer and carry it off, leaving a smooth plain of rock. This hypothesis seems at least as probable as that of sheet-flood erosion. As the effect of the climatic changes of the Glacial Period and later times is not considered, there are almost no places where the theoretical considerations here advanced can be adequately tested. It is probable, however, that some parts of southeastern California have always been dry enough so that they furnish approximately the desired conditions. It is possible that Professor Lawson's substitute for sheet-flood erosion might work more effectively if he would add to the present paper a consideration of what would happen during glacial and interglacial epochs and stages. During epochs of moist climate there may have been a stripping of fanglomerates, which would account for many of the broad rock benches without either sheet-flood erosion or the extreme degree of lowering of the mountain demanded by the hypothesis here suggested. ELLSWORTH HUNTINGTON.

CLARKE, F. W. **The Data of Geochemistry: Third Edition.** 821 pp. Index. *U. S. Geol. Surv. Bull. 616.* Washington, 1916. [A "critical summary of what is now known [of geochemistry] and a guide to the more important literature of the subject," revised and enlarged from the first (1908) edition, which appeared as *U. S. G. S. Bull. 330*, and the second (1911) edition, which appeared as *Bull. 491*.]

HOLMES, ARTHUR. **Radioactivity and the Measurement of Geological Time.** Diagr., bibliogr. *Proc. Geologists' Assoc.*, Vol. 26, 1915, Part 5, pp. 289-309. London. [Abstracted in the April *Review*, pp. 305-306.]

PHYTOGEOGRAPHY AND ZOÖGEOGRAPHY

BERRY, E. W. **Notes on the Ancestry of the Beech.** Maps. *Plant World*, Vol. 19, 1916, No. 3, pp. 68-77. [Abtracted in this number on pp. 378-379.]

—— **Leguminosæ, The Distribution of, and Past Geographical Changes.** *Geogr. Journ.*, Vol. 46, 1915, No. 5, p. 399.

RIGG, G. B. **Physical Conditions in Sphagnum Bogs.** *Botanical Gazette*, Vol. 61, 1916, No. 2, pp. 159-163. [A summary from H. J. Cox's bulletin on frost and temperature conditions in the cranberry marshes of Wisconsin (*Weather Bur. Bull. T*, 1910) of data bearing on the ecology of sphagnum bogs.]

HUMAN GEOGRAPHY

ANTHROPOGEOGRAPHY

BRIGHAM, A. P. **Problems of Geographic Influence.** *Annals Assoc. of Amer. Geogrs.*, Vol. 5, 1915, pp. 3-25. [Abstracted under the title of "Geographic Influences in the Field of Science" in the March *Review*, pp. 223-224.]

HUNTINGTON, ELLSWORTH. **A Neglected Factor in Race Development.** Diagr. *Journ. of Race Development*, Vol. 6, 1915-16, No. 2, pp. 167-184. [Influence of climatic changes: work of Matthew, Brückner, Pettersson drawn upon, as in Doctor Huntington's article in the March *Review* on "Climatic Variations and Economic Cycles."]

MAUNDER, E. W. **The Principles of World-Empire.** *Journ. of the Trans. of the Victoria Inst.*, Vol. 47, 1915, pp. 11-34. London.

TRÄDGÅRDH, IVAR. **Människans andel i insekthärjningars uppkomst: Några biologiskt-geografiska synpunkter.** *Ymer*, Vol. 35, 1915, No. 3, pp. 273-281. [Man's part in causing insect ravages.]

ECONOMIC GEOGRAPHY

LYON, T. L., E. O. FIPPIN, H. O. BUCKMAN. **Soils: Their Properties and Management.** (Series: Rural Text Books.) xxi and 764 pp. Maps, diagrs. The Macmillan Co., New York, 1915. $1.90. 8 x 5½.

In the preparation of the 1915 edition of the former work of the same title by Lyon and Fippin, the authors associated with them their colleague, H. O. Buckman. The result of this renewed effort is ample cause for congratulation since the book is without question one of the most complete works in English on the subject of soils. The subject-matter has been much revised and rearranged in the present edition, and a generous amplification in the treatment of some of the old material has increased the size of the book from 531 to 764 pages. The usual fundamental principles of soils science are given ample consideration, and the origin of soils, the geological relationships therewith, the composition and classification of soils, and the outstanding features of the physical properties of soils receive careful consideration in the first seven chapters. Half again as much space as in the former volume is then given to the important matter of organic matter in soils, which in turn is followed by a new chapter on the colloidal matter of soils. The next five chapters treat of soil structure and of the relations of plants and soils to those two important requisites to plant growth—moisture and heat. The next two chapters deal at much greater length than the corresponding ones in the former edition with the availability of plant nutrients in soils and the absorptive properties of the latter. A chapter on the subject of acid soils supplants the very brief statements on the subject in the earlier work, and that is followed by chapters on alkali salts and on some plant-physiological principles relating to absorption of nutritive salts by agricultural plants. The succeeding chapters treat of soil organisms, soil air, commercial fertilizers, soil amendments, fertilizer practice, farm manures, land drainage, tillage, irrigation and dry farming, and the soil survey.

Altogether the subject-matter is lucidly, though briefly discussed, and the student finds in the new work an excellent and helpful bibliography, which was missing in the first edition. The latter fact easily compensates for the deletion of many of the illustrations of the earlier volume. Most welcome of all is the clearly marked tendency of the authors to burst the shackles of conservatism which bind many of us so securely to the old and revered "orthodoxy" in soils science and to emerge into the atmosphere of "modernist" progress. It would have been better to carry this tendency still farther. The chapters on commercial fertilizers, farm manures, tillage, and the like might have been much more curtailed and those on plant-physiological principles, soil colloids, available plant nutrients, adsorption and absorption much more amplified. Despite all this, their colleagues owe a debt of gratitude to the authors for a comprehensive and very readable text on soils.

CHARLES B. LIPMAN.

TAUSSIG, F. W. **Principles of Economics.** 2nd edit., revised. Vol. 1: xxxvii and 547 pp. Diagrs., bibliogr. Vol. II: xviii and 573 pp. Diagrs., index, bibliogr. The Macmillan Co., New York, 1915. $4. 8½ x 6.

This book, published originally in 1911 and reprinted seven times before the appearance of the present edition, has been warmly received by economists. Though widely used as a textbook for college students beginning the study of economics, it was not prepared primarily for this purpose. The writer's object in making the book was "to state the principles of economics in such form that they shall be comprehensible to an educated and intelligent person who has not before made any systematic study of the subject." Professor Taussig's purpose has been well accomplished, and it can be truly said that his work presents in readable form the fundamental conclusions of modern economists and the lines of reasoning upon which such conclusions rest. It may, perhaps, be correctly designated an orthodox or theoretical treatment of the subject based upon wide observation and sound common sense. There are some economists of the present day who emphasize the importance of geographical factors (along with various other factors) in explanation, in part at least, of certain economic phenomema. There is little if any indication in Professor Taussig's book that such an idea should find expression in a treatise on the principles of economics. There is, however, in the chapter on the division of labor an interesting discussion of geographical division of labor, its causes and consequences. Again, in the discussion of the theory of international trade, the student of economic geography will find some material sufficiently related to his own particular field to furnish food for his serious thought. Nevertheless, it must be admitted that there are to be noted in Professor Taussig's volumes but few points of contact between the fields of economics and geography. The book may be warmly commended, however, to the serious attention of geographers not because of any contribution which it makes to the fund of geographical knowledge, but because of the broadening effect which it is bound to produce upon geographers from coming in close touch with a high-grade work in the social sciences where the main line of interest is mankind.

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